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AGRICULTURE, SHIKAR & TRAVEL.

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THE

INDIAN FORESTER.

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ON THE WORKING OF THE FORESTS IN BAHRAICH AND THE BORDERING NEPALESE DISTRICTS IN ITS RELATION TO QUESTIONS OF CONTROL.

Introduction.—The proper control of the Government forests in Bahraich is complicated by a number of special circumstances, which again re-act on the revenues. It will be the business of this article to describe what these special circumstances are, and to suggest corresponding remedial measures. It occurred to me that, while occupied on such a very instructive and wide-ranging subject, I would do well to amplify it so as to embrace a very detailed account of all those methods by means of which we endeavour, in this part of India, to place a check on the illicit removal of material from our forests.

Much of this will necessarily appear superfluous to the readers ; but others—notably in localities where protection is difficult, or has but just commenced—should take an interest in this part of my subject. This, and the conviction that, apart from the bulk of my article, I have treated throughout on a number of instructive questions, is my apology for the length to which I have permitted myself to run.

Extent and importance of the Nepal forests subtending the Bahraich district.—The Nepal forests extend all along our frontier in Bahraich, occupying most of that very considerable territory which was given by us to the Nepalese some thirty years ago for their assistance during the trying times of the Mutiny, and which is popularly known as the "Nepal Terai." The hills and valleys beyond this again, like our own hills and valleys similarly situated in Garhwál and Kumaon, are rich in forests of every description, while the great Rapti valley has acquired, in this respect, a wide-reaching fame. These forests are, therefore, of enormous area, and the forests of the Terai alone have always borne the reputation of being the finest sál forests in all India. They may be said to be inexhaustible.

The causes which tend to make purchasers go in preference

to Nepal for their timber and other forest produce.—There are very many reasons why purchasers should, as a rule, and when in a position to do so, prefer going to Nepal for their supplies of timber and other forest produce. In the first place, they can obtain in Nepal a better article at a lesser cost. We cannot compete with Nepal. A mere reduction of rates on our part would be immediately followed by the same step being taken on the part of the officials across the border. With their inexhaustible resources, and with no expense in the way of an organized forest establishment to provide for, no forest improvements to pay for, these latter can, of course, afford to reduce their rates below what would amount to absolute ruin in our own case. Then we do not possess the fine quality of timber that is found in Nepal. In fact, we have got in Bahraich comparatively very little sound mature sál timber at all.

On the other hand, the quantity of dry and inferior sál is so great everywhere—even in our own forests—and the rates for this are necessarily so very reasonable, that other species of trees—and we have remarkably fine "asna" (*Terminalia tomentosa*) and "tikwee" (*Adina cordifolia*) trees—find almost no sale at all.

The Nepalese, it is true, export very considerable quantities of "asna" and "asidh" (*Lagerstræmia parviflora*) poles, but at prices which we should deem ruinous to the seller. The Nepal forests being but continuations of our Bahraich forests—themselves but a narrow fringe along the frontier—in a northerly direction, there is nothing to choose between the two in regard to distance, not at least so far as the timber merchant is concerned. The whole southern border of the Nepal forests is sapped by numerous roads constructed by ourselves within the Government forests, while two excellent rivers communicate with the far interior. Although, therefore, not so accessible as our own forests, the advantages possessed in this respect by the forests of Nepal are of no mean order. Water again is better and much more plentiful than with us.

Once arrived in Nepal, the dealer has no long search to make before finding what he is after. His movements and actions are in no way interfered with, as among ourselves, by necessities of control and conservancy. He is not afraid of firing the forest. In fact, he will certainly do so if he can thereby derive any additional comfort or advantage. He can cut almost where he pleases and what he pleases, neither is he restricted as to time. He knows pretty well what his logs should cost him, and with tact and resource he can hope to do a good deal occasionally without at all having to disburse in the same proportion.

Nature of the purchaser's objections in respect of our Government system of control in Bahraich.—The nature of the purchaser's objections in respect of the method of control followed in the

Government forests of Bahraich can be summarized in accordance with his own notions on the subject. Of course, many of the inconveniences complained of by him are inseparable from an efficient system of control as opposed to the total absence of these conditions in Nepal. Still, I think that some of the delays incurred by purchasers in our forests are capable of being rendered somewhat less serious, and that a few other inconveniences could perhaps be mitigated, if not removed. If they exist at all, the fault is not, as a rule, a departmental one. Any great improvements in the existing system mean an increase of establishment, and this increase we have hitherto appealed for in vain.

(*a*). He has to dance attendance on some official until he has succeeded in getting the preliminary permit supplied to him, and the trees selected by him approved of and marked.

(*b*). He may have to remove his logs out of the forest before the advent of the fire conservancy season, under pain of having to abandon them to the following winter.

(*c*). He has to collect the material in some stipulated locality for the purpose of having it measured up and passed, previous to his paying the balance on the same and being finally permitted to cart it away.

(*d*). He has to dance attendance once more on some forest official until this latter person finds himself possessed of the leisure to measure up the material in question, in consequence of which the purchaser is always subjected to more or less grievous delay, losing his time, and obliged to pay more in transport than would have been necessary if we had, like the Nepalese, a system of fixed revenue stations with officials always present to measure up and pass timber at the moment of its arrival.

(*e*). He has the strongest objection to our tariff system, which places him at a great disadvantage in his struggle over payments with the Ranger. The cubic foot is incomprehensible to him as the basis of our calculations. Unable himself to determine the capacity of his log, he surrenders himself a helpless, but thoroughly discontented person—in his opinion, victim—to the generosity of our Ranger. He can very well understand having to pay a fixed price for logs belonging to the same class as determined by well-known limits of length and of girth; this he is intelligent enough to grasp; and, moreover, he is able to learn a simple tariff of this kind by heart, and capable of not paying more than he knows to be written down in such a tariff. But

how should he know any thing about volumes? Do you expect the illiterate dealer to go about with a translation of Hoppus's Tables in his "kummerband?" Surely we should put a stop to this absurd tariff system of ours! of itself, it is enough to drive away all our native customers.

Classes of timber and other produce that are passed into Bahraich from Nepal.—The timber and other forest material that is passed into the Bahraich district from Nepal can be classified as follows:—

(*a*). Logs of green mature sál, generally of very fine quality and dimensions.

(*b*). Dry sál timber of all dimensions, converted and unconverted. The converted timber is confined to props, posts, rafters, canoes, &c., &c., all fashioned out of hollow sál trees.

(*c*). Poles of asna and asidh (*Terminalia tomentosa* and *Lagerstræmia parviflora*). These poles are generally very fine ones, being often of 50 feet in length with a mean girth rising up to 3½ feet.

(*d*). Kutch, hides, wax and honey, canes, bunkus-grass (bhábar), múnj grass, reeds, &c., &c.

Lines of transit followed by the Nepal timber merchants.—The whole of this export from Nepal passes into the Bahraich district in two different ways:—

(*a*). By means of the river Rapti, and the rivers Koriala and Girwa (which further down in their course unite to form the great Gogra).

(*b*). By means of numerous roads in communication with the Nepal frontier, and which, after traversing the Government forests, finally abut on to the above two rivers.

In regard to these two main lines of transit, it is necessary not to lose sight of the fact that, while both of the rivers mentioned above flow through our Government forests immediately after leaving Nepal, so also most of the roads in question are departmental roads constructed within the limits of the Bahraich State reserves. In other words, almost all this import from Nepal finds an issue into British territory by way of our Government forests.

Final destination of the timber and other forest produce from Nepal.—The whole of the superior Nepal timber is taken down the rivers Gogra and Rapti to Byramghát, Fyzabad, Gorakhpore, Dinapore, &c., &c. The inferior stuff is, in great part, consumed within the district itself, as also a certain quantity of minor produce, principally reeds and grasses. Latterly, much "bunkus" grass (bhábar grass) has found its way to the paper mills in Lucknow. The kutch, hides, honey, &c., &c., find a ready market in the larger towns of the province. I have seen

no bamboos imported from Nepal, although the lower hills of that country should be as rich in this commodity as the similarly situated hills in Kumaon and Garhwál. The incontested fact of the presence of elephants in the Nepal Terai should, of itself, be sufficient evidence of the existence of bamboos.

The Nepalese system of forest control.—I shall now describe in general terms the Nepalese system of control, as applied by them to their forests. Being founded in great degree on the assumed integrity of a host of very underpaid officials—in which it has some points of resemblance with our own—this system would be considered as open to several objections on the part of any proprietor who should not think himself satisfied with a moiety only of his revenues.

The timber and other forest produce collected by purchasers in Nepal has to pass out of that country by some one or other of a numerous system of frontier revenue stations. These latter are conveniently situated for the purpose on the banks of important rivers, at the only points of egress from enclosed valleys, and along the more important roads leading to the frontier. The paucity of these roads and the nature of the country renders it difficult to evade this obligation. Besides which, the punishments in Nepal for misconduct are on rather a barbarous scale, and persons who have not behaved themselves well enter the country again at considerable personal risk. These frontier revenue stations, or "chaukies," are of two classes, the major and the inferior chaukies. In the richer timber districts the former alone exist, or are supplemented by but a few inferior chaukies. All purchasers in quest of sál logs, and superior timber generally, have to make their applications at the larger stations, each of which is presided over by a superior official of the rank of a "Lieutenant-Sahib." But purchasers requiring any other form of timber; anything, in fact, but sál logs, are not necessarily subject to this rule. For such purchasers, permits can be obtained at the smaller chaukies dotted along the frontier.

In either case the purchaser is obliged to provide himself with a permit before he is permitted to commence operations within the forest. In this respect the Nepalese system of control does not vary from our own. And in the same way the purchaser has to pay an instalment in advance, and when his material has been got ready for export, he is also under the obligation of having it measured up and passed at the station or post whence he originally procured his permit.

After having here paid the balance due on his purchase, after deduction of the instalment already referred to, he is permitted to depart from the country. But if his purchase should include superior sál logs, the latter have, as a final measure, to be stamped with the Nepalese timber sale-marks. I shall refer to these further on. In return for his money, the purchaser obtains

a written pass, in which are entered particulars in connection with his purchase. The amount paid is most generally omitted. These Nepalese timber passes are impressed with the seal of the issuing revenue station.

If we consider the Nepalese system of timber control from the point of view of the obstacles which it presents to thefts from without, then is this system almost perfect. On the other hand, if we look at it from the no less important aspect of the hold which it should exercise over the revenues realized by the forest officials, we come perforce to the conclusion that no such control even exists. At the superior stations the "Lieutenant-Sahib," and at the smaller posts the Mohurrir, can do pretty well what they like with their forest revenues, so long as they do not go beyond certain limits, so long as they can depend on the loyalty of a jealous, and perhaps a hostile entourage. They have, it is true, to remit the revenues realized by them periodically to the district treasury. But accounts, in our sense of the word, are unknown, or are only submitted after lengthy intervals of time—say one or two years.

Peculation within certain undefined limits is, therefore, tolerated.

Names and situation of the Nepalese revenue stations off the Bahraich forests.—It may be useful here to mention the names and the situation of all the Nepalese timber chaukies that are situated off the Bahraich Government forests. They are as follows :—

Name of Forest.	*Main Chaukie.*	*Subordinate Chaukie.*
Burthapur, ...	Dhanowra (river station), ...	...
	Chowbarsi („ „), ...	...
Motipur, ...	Dhanowra („ „),	Taratál.
	Bachhi („ „),	
Chakia, ...	Jumni, ...	...
	Báki, ...	...
Bhinga, ...	Bhagwanpur (river station), ...	...
Sohelwa, ...	...	Khairbatti. Markátwa. Ajgarwa. Mandowra. Bhowa. Bhainsahi. Sonpathri.

The Nepalese forests opposite Sohelwa, and which are not tapped by the Rapti river, of which the great frontier revenue station is Bhagwanpur, include only a range of very steep and barren hills. It follows that only inferior material and minor

produce is imported into British territory in that direction, and this accounts for the absence of any important revenue post.

On the other hand, the configuration of the ground is such that, divided up as it is into a number of confined ravines and valleys—almost all of them mere *culs de sac*—each of these latter is bound to have its own independent chaukie, if there is to be any control at all ; hence the great number of these smaller revenue posts in Sohelwa.

Nepalese timber marks.—The Nepalese regard any thing below a sál log (of say 5 feet in mean girth) as being too unimportant to stamp with their sale-marks. It is true that the Nepal Darbár, in a communication of its orders on the subject to the British Government, points out that every thing exported from the Nepal forests, and susceptible of receiving a sale-mark, should be so marked ; but the orders of the Supreme Government do not appear to be, in this respect, at all attended to.

The timber marks of the Nepalese are very peculiar. Upon each log passed through one of their main depôts—supposing that the log in question is important enough for the purpose—the following sale-marks have to be impressed in the Hindi character :—

1. The first letter of the word "Bikri," or sale.
2. „ „ „ „ "Dwár," or depôt.
3. „ „ „ depôt itself.
4. „ „ „ word "Lambaee," or length.
5. „ „ „ „ "Motaee," or girth.
6. Figures denoting the length.
7. „ „ „ girth.

From the above you will be able to gather some of the reasons why the Nepalese should be rather frugal of their marks and should object to applying them to other than very valuable pieces of timber. Think of the waste of time ! A really properly marked Nepalese log—I have seen very few of them, however—resembles nothing less than an Egyptian monument of ancient date.

Nepalese timber passes.—The Nepalese timber passes are in manuscript, in the Parbuttia language, and bear the impress of the chaukie which issued them. There could be no objection to these passes if there was only some control over the persons issuing them. It is not pleasant to think that, for a small consideration, the mohurrir at a neighbouring Nepalese chaukie—an underpaid official, and therefore presumably not tickled with an excess of pride—might take it into his head to add a little to his income by manufacturing passes—perfectly genuine passes too—for evilly disposed persons, who could then make use of these passes to export stolen material from our own forests. It is also a grievous drawback that, these passes being drawn up in the Parbuttia language, none of our officials can make anything of them.

Our interest in keeping a watchful control over imports into Bahraich of timber and other forest produce from Nepal.—From all that has preceded it will be understood why it is that the Forest officer in Bahraich has to exercise so much supervision over imports of timber and other forest produce from Nepal.

Because, assuming that a Nepalese pass has been honestly come by, the difficulty still remains that none of our officials can decipher these passes. It is therefore, possible for a purchaser to cover stolen timber or other produce from the Government forests under a Nepalese pass that has done its duty considerably more than once. Our officials see only that the pass is a Nepalese one, and stamped according to the regulations. But whether it be a new or a venerably old document, this they cannot say.

We have, in our Bahraich forests, so very few fine mature sál trees that extensive thefts of this kind of timber could hardly be committed without our knowledge. But, on the other hand, it would be extremely feasible to steal any other form of timber or produce in the way referred to by me.

For instance, we have noticed the large import of superior asna and asidh poles into Bahraich. Nearly all of these are made to traverse the Motipur sál forests, themselves very rich in the same quality and the same kind of timber. The fraud, if committed in this direction, would not be at all easy to discover, seeing that we are, ourselves engaged in weeding out this class of timber from the forests in question, and in a wholesale fashion that precludes the possibility of our applying a departmental mark to the stumps left on the ground.

Again, the circumstances of the Nepalese forests bordering our own in Sohelwa are, in certain respects, similar to what we find in the Government reserve opposite. Although the former are ever so much poorer, the same class of material, namely, dry sál timber, poles of inferior species, and minor produce generally, is largely exported from both. It is evident that most of the above articles are susceptible of being removed in large quantities without leaving suspicious traces behind. This will be better understood as we proceed. I remember detaining two or three wagons full of dry sál scantling in Sohelwa last year. All had, in any case, traversed the Government forest, since there is no other means of exit from Nepal in that direction.

The one purchaser, or thief—whichever you like to call him—had no pass at all; the other pass bore no seal, or any detail whatever in connection with the purchase. But by the evening of the day of detention all had succeeded in procuring the necessary particulars to their passes. But the question which I should like answered is this: "Were these passes concocted for the occasion by the kindly disposed chaukidar on the frontier?" As I have said before, it would be an advantage to have some control over the persons issuing these passes.

I do not argue at all that frauds on a large and important scale are perpetuated in Bahraich to the loss of our forest revenues. I only wish to show that these frauds are feasible, and very difficult of detection under existing conditions. I, moreover, insist that if a check can be instituted to prevent their occurrence, and that without undue expense, then this check should be imposed.

To me it is apparent that imports of forest material from Nepal should not be, as at present, permitted to find their way into Bahraich by every forest road or cattle track. Moreover, I am of opinion that these imports should be subject to regular inspection and scrutiny on the part of an establishment organized for the purpose, and posted in a manner convenient for the importers and for ourselves. All passes should, after such examination, be duly cancelled and rendered unfit for further use in the forests.

The collusion of the Nepal officials at the frontier chaukies, the possibility of which I have before alluded to, could be removed from the list of feasible acts by our coming to an agreement with the Nepal Darbár, in pursuance of which their forest officials should be obliged to issue to the purchasers duplicate passes in all cases, one of which to be retained by ourselves.

It is obvious that if we then returned all the latter to the Nepalese Commissioner of the district in question, this last named officer would not only have a solid check on his forest revenue, but that the frontier chaukidars would be most careful not to increase unduly the number of vouchers which, later on, they would have to account for. This duplicate system would, of course, also put an entire stop to the employment of old passes on the part of purchasers.

Further on, it will be seen that I strongly advocate this same system of control for our own Government forests, and for the private forests adjoining them. No system of forest control can be instituted without a certain degree of inconvenience to the purchasers, and if we adopt this system in our own case without employing the same means of protection in reference to Nepal timber and produce, the result would, of course, only tend to send still more purchasers to Nepal.

The private forests of the Bahraich district.—In connection with the private forests of the Bahraich district, I am only concerned with those private properties of the kind which are adjacent to our Government forests, and which affect the control of the latter much in the same way that the Nepal forests do.

There are private forests off all the Government reserves in Bahraich. They vary in extent from a few acres only to a few square miles; the largest not exceeding four square miles. In most instances, they are continuous with our own, being separated by a ditch only, a road, or small strip of cultivation.

Again, the circumstances of these private forests are very much the same as what we meet with in our own forests near by. More ruinous, perhaps, which, however, is only one other inducement for the owner to resort to indirect means for making his property last him a little longer. To the dishonestly-minded these private forests offer an excellent cover for the perpretation of thefts of Government material. It is so plausible to say that such and such timber or produce came from private forests; for, as we shall presently see, the declaration is not one easy to confute. There is no reason indeed why the declaration should not be in all cases indirectly true, because our timber and other produce can be smuggled into these private forests with exceeding ease.

The presence of these private forests is, therefore, a very great nuisance to us from the point of view of our control; only less a nuisance than the Nepal forests, because comparatively insignificant in extent.

Classes of timber and other forest produce exported from private forests in Bahraich.—Where our Bahraich forests touch on to cultivation they are, as might be supposed, in a deteriorated condition, and since most of these private forests constitute the outermost fringe of the former, they too are necessarily in poor circumstances. Generally speaking, their condition is ruinous, containing, as they do, only hollow old sál trees and misshapen poles. Some narrow strips are, however, not wanting in good sál poles, while other forests include little beyond inferior species. The exports from these private forests are principally composed of rafters, props, posts, canoes, cattle troughs, and implements of all kinds, the whole cut out of hollow old sál trees. In addition, firewood, charcoal, mohwa flowers, grass, honey, &c., &c., are also exported.

Lines of export for private timber and other forest produce in Bahraich.—From the situation of the forests with which we are dealing, it is evident that the material taken out of them does not necessarily pass through our Government forests. At the same time, much of it does so pass. For instance, most of the timber and other produce from the private forests east of the Bhinga State reserve traverses the latter on its way to the Rapti river, or to places west of that river.

As might be inferred, all, or nearly all, the material exported from these private forests is consumed within the district itself. The timber is too inferior to command the attention of dealers.

In what way the export of material from private forests interferes with our control.—We have thus to contend with the same difficulties in respect of this export from private forests that have been under discussion in reference to the Nepal timber trade. If of much less importance, the former are still more apparent.

The Nepalese, for instance, do mark some of their timber,

and they do supply all their purchasers with passes more or less in order. Again, the sale-marks used by the latter, and the nature of the impressions applied by them to their passes have been duly registered by them in our office—although in an imperfect manner, it is true. But the private owners of forest follow no system whatever. The purchaser obtains a receipted acknowledgment for his money, and this constitutes his pass, his title to the material under his charge. But these acknowledgments, written out as they are on common bazaar paper, without stamps or distinguishing impressions of any kind, naturally afford no clue, of themselves, to the genuineness of the implied transaction. They might, in almost any instance, have been manufactured by the protended owner himself, or by any other native competent to write his own name. As for sale-marks, proprietory marks on the timber itself, nothing of the kind is ever seen. Naturally, all private timber is, therefore, invested with a very strong element of suspicion. Nevertheless, we are not entitled to detain such timber on mere suspicion, and no law compels private owners of forest within the Bahraich district to submit to such regulations as are necessary in this respect for the common weal. Evidently, all of these people should be legally obliged to stamp both their timber passes, and their timber itself, with distinguishing marks not easy of imitation, and these marks should be registered in our office.

Condition of the Government forests in Bahraich.—The forests belonging to Government in Bahraich either contain but few species that have any present commercial value, or they are young forests, or they are very old and deteriorated forests, or they have been already sufficiently worked pending the appearance of young growth on the ground ; or finally the only mature sál trees met with are all very unsound. There are but few localities in our Bahraich forests whence we can just now consistently remove mature sound sál timber. Narrow tracts of such workable sál forest have been preserved to us in Gubbapur, thanks to the difficult nature of the ground in those parts ; and again, occasional mature good sál trees are found throughout the extensive pole forests of Motipur and Chakia. There are also portions of forest which, in view of their permanent use as grazing reserves, it is not advisable to keep intact, with no other result than the still further deterioration of the stock of mature trees. Here, of course, we are interested in cutting out the latter without regard to questions of conservancy.

Generally speaking, however, the outturn of the Bahraich forests is confined, and must be so confined for a long time to come, to the following :—

Classes of timber and other produce yielded by the Government forests.—

1. Dry sál timber, either in the rough, or converted into canoes and various small scantlings.

2. Canoes, or small scantling, converted from hollow green sál trees.
3. Green sál poles, the result of thinnings.
4. Logs and poles of inferior species, the result (at least the latter) of weedings.
5. Charcoal and firewood.
6. Minor produce, the principal of which are catechu, hides, mohwa flowers, honey, and thatching grass.

The people who come to the Government forests for their requirements in timber and other produce.—At the commencement of this article, I discussed the causes which impelled most persons in quest of timber to go to Nepal in preference to our own forests. Those who obtain their supplies from the Government forests can be summarized as follows :—

1. Dealers and others who have not got on well with the Nepalese officials, and who dare not return to that country.
2. Persons who are very much pressed for time, or for whom the season is now too far advanced for a journey into Nepal.
3. Local dealers, who are always on the watch for dry timber or windfalls or line-timber of *superior quality*, and which, when paid for at ordinary rates only, leave these persons a large margin of profit.
4. Persons who require firewood or charcoal, of which the prices are too low to render necessary on their part a journey into Nepal.
5. Persons who have purchased contracts for various articles of minor produce at the public auctions of the same.
6. The privileged classes of the population (including all persons living within three miles of the forests), who obtain all they require for nothing.

I mentioned previously that I thought the inconveniences complained of by purchasers in their dealings with our officials could be mitigated. This could be easily effected by making the Rangers independent of the revenue collections, or by adding to their number, and thus expediting the work of final measurement. Finally, we should have a tariff of fixed prices for every log, according to mean limits of girth and length, and abandon "Hoppus's Tables." More than this we could not do. Our forests are too poor, and too accessible at all points, for us to be able to establish permanent posts all through our forests for the immediate measurement of material passing through them. With us, the agent of inspection, measurement, and final settlement, must necessarily be a cheap, movable instrument ; and pending its travels from point to point, purchasers must occasionally be exposed to delay. Of all the above people, the "local dealers" and the "privileged populations" alone claim our attention.

The local dealer in material from the Government forests.—Every Government forest in Bahraich has one or more "local timber merchants" living off its borders. The nearer he can approach his place of abode to the forest, the better is he pleased, and his reasons for being so are many and manifest. The "local dealer" is often a great friend of the Ranger, a great friend of every forest official in those parts. These people probably compete among themselves as to who shall be the popular favourite. They are a very great nuisance. They will buy nothing that is not a great bargain, and depend on the Rangers, and the other officials, for the earliest information in regard to anything exceptional and out-of-the ordinary for its quality, or the abnormally cheap rates at which it is to be disposed for. And here it may be remarked how seldom our native Rangers approve of increased revenue rates, how frequently they have occasion to recommend reductions in this respect, with urgent appeals as to their difficulty in inducing purchasers to come forward. And when, at the Ranger's disinterested suggestion, these rates have been reduced, it will be often observed with what singular dispatch the whole of the material in question disappears into the yard of some "local timber merchant."

The proximity of all these timber yards to our forests is objectionable from other points of view. For instance, it is comparatively easy to smuggle timber into them, and that without the connivance of the forest officials. Once in the yard, it is no long operation to so far convert this timber as to make it no longer recognizable. In this way, a few passes may be made to serve for a good deal of timber, and a good deal of timber be disposed of that has never been paid for. Again, the sale of timber by these people interferes in other ways with our control. For instance, we meet a load of timber in transit, not far from our forests, or perhaps passing through them. We demand the title of the person before us to this timber. In reply, he shows us a dirty scrap of paper with just a few words traced upon it in a common hand. This purports to be a receipt in full by a local dealer on account of timber purchased from him. This timber may, or may not, bear Government sale-marks. The presence of such marks only shows that the Ranger gave over this timber to somebody. It does not necessarily mean that that somebody paid anything, or, if he did pay anything, that the Ranger contributed any portion of this payment to the proper deposit for such payments. Far away from the forests, we should have, perhaps, no reasonable right to ask these questions in regard to any timber in transit. Such a course would, perhaps, interfere with the civil rights of the people. But when we meet this same timber only a mile from the Government forests, or actually inside the latter, then surely it is our duty to make all necessary enquiries in reference to it. If then, the timber is marked and wholly uncon-

verted, our only course is to refer to the timber dealer in question. If, after examining the latter's passes, we found no piece of timber which agreed in any way with what had aroused our suspicions, we should conclude that the timber had been dishonestly come by. But since the dealer might deny ever having sold this timber, it would always be necessary to detain the latter pending these enquiries. In other words, we should have to detain all such timber in transit. But we have no legal right whatever to inconvenience the public in this fashion. Moreover, if the timber happened to have been converted in any way, a visit to the timber dealer in question would be perfectly useless, for reasons that I have already given. It is evident, therefore, that, from whatever aspect we consider the presence of the timber dealer on the borders of our forests, that presence is most dangerous to ourselves—much more so, in fact, than that of private forests. When the material collected by these dealers is grass, firewood, charcoal, or any form of minor produce, it is evident that the control becomes still more difficult, because so long as this produce is sold off in proportion to the quantity taken in, it is possible for a single and very cheap pass to serve for a long time indeed.

Legislation required to prevent the conversion of timber within a certain distance from the Government forests, and for placing certain other restrictions on the sale of forest material within the same limits.—If it was found necessary to legislate for the material drifted down our rivers by floods, and to forbid, for this purpose, certain acts within a considerable distance of the latter, it is surely time also that some such similar laws should be enacted for the protection of the forests themselves, against all proceedings that have a tendency to make the control of these forests difficult. This protection would be ensured here by forbidding the conversion of timber within a certain distance from the Government forests by others than *bonâ fide* owners of forest, and by enacting that all material sold by any person within that zone should be covered by the original pass under which that material was purchased, endorsed by its last owner to the person buying it from him.

This method of procedure would entail on us the necessity of supplying dealers of this class with a greater number of passes than, in the case of other purchasers, would be sufficient. The former could not otherwise dispose of their material on retail to the general public, according to their present practice. But it is felt that even this inconvenience would be an improvement on the existing state of things. Evidently also, these dealers should be obliged to register themselves ; and it would be an advantage if they were compelled to give security for good behaviour.

The privileged populations—extent of their privileges.—The whole population within three miles of any Government forest in Bahraich is entitled to receive, free of payment, all its require-

ments in timber, fuel, thatching grass, &c., &c., and any other material of forest origin which it might want for *bonâ fide* household purposes.

The sale or barter of this free produce on the part of a recipient evidently, therefore, constitutes an offence analogous to the misappropriation of another person's property, since this produce does not cease to remain the property of Government for all other purposes than that here sanctioned.

On the nature of the difficulties to control presented by our obligations to the privileged section of the community.—When you consider that this privileged population does not number less than 40,000 souls, that our forest establishment is notoriously short of hands for the performance of the most ordinary duties of their class, and that the demands of these privileged people are but little regulated by any circumstance of time, or season, or place, by any correct knowledge on our part of their genuine requirements, or in any other way whatsoever, then it will be easily intelligible to you that our obligations in this direction are a very grievous obstacle to proper control as applied to the forests generally, and that this control cannot be extended with any degree of efficiency to what this privileged population itself consumes.

An intelligent control, even an economical administration, would seem to demand that the indents made by the privileged classes of the community should be supported by something better than their own interested testimony. Yet, in practice, we have virtually to satisfy ourselves with the latter, and with the knowledge that the sale or barter of the material supplied by us would amount to a criminal offence. For it is evident that we have neither the time nor the means to make enquiries in respect of the thousands of indents that thus pour down upon us from all quarters, regardless of time or season, during the course of the year; neither are we justified in exposing the public to the inconveniences which the delay of such enquiries would necessarily subject it to.

A practical control over the consumption of Government property by the privileged people would demand that the indents from each village should be made collectively and at stated periods only, and that these indents should be supported by a declaration as to their moderation and *bonâ fide* nature on the part of a competent authority. And the same course is dictated by the requirements of our control over the forests generally. Let it be said at once that there is nothing so unsatisfactory in connection with the Bahraich State forests as the supervision and control exercised over them, a condition of things mainly due to our position in regard to the privileged population. It is not wonderful that the forest officer should have such strong objection to the privileged system, because it simply cripples all his endeavours to control the property entrusted to his keeping.

And further on, we shall see that it is a cause of immorality to his establishment, and to the public itself.

We have no right to supply the privileged populations with mature trees, but with poles only. The consequence is that the number of trees given over each year is excessive. Where five mature trees should be sufficient, we have to deliver something like a hundred poles. The number of the latter required during the course of every year is, therefore, very excessive. And the demands not being confined by any rules as regards time or season or place, it is evident that we cannot consult the interests of the forest to the extent of selecting all these poles ourselves. Such a course indeed would require an independent and specially trained establishment for the purpose. The result is that we have to submit to these people going into the forest and selecting their own poles. This condition of things has become a positive danger to the forests since Government, on the advice of persons perfectly ignorant of the requirements of forest conservancy, has extended the privileges of the people to species belonging to the dominant stock on the ground. Before Government adopted this course—this most regrettable course—we had the consolation at least of knowing that the operations of the privileged classes in the forests, excepted as they were from the principal trees met with, must of a necessity be conducted over large areas, and partake, in certain localities, at least, of the beneficial character of weedings.

The evil effects of this concession on the part of Government have not yet had time to develope themselves, seeing that it is but a very short time since the news of it spread among the people.

We, moreover, endeavour to minimise the mischief by confining our supplies in this respect to such purposes for which, in reason, they should alone be required. This is perhaps somewhat arbitrary on our part, seeing that Government made no such limitation. But what would be the result if, in the absence of any limitation of the kind, we consented to the people getting just what they asked for—ebony, "asna," and "dhao" poles, for instance, for common fencing purposes? The result could not fail to be that such forests as Bhinga and Sohelwa, in which the above species occur gregariously over considerable areas, would be much denuded. These people naturally do not care to go hunting about for their requirements, and concentrate their fellings wherever circumstances will admit of their doing so. Concentration of this nature signifies denudation, and ruin. It is as well to call facts by their true names.

We have, I have said, to submit to the selection and felling of trees within our forests on the part of the privileged populations themselves. The consequent waste is, of course, great, and there are other evil results besides those already mentioned. For instance, it is impossible to get them to cut their poles flush

with the ground, hence not only waste of material, but a barrier to the appearance of the coppice which would otherwise have replaced the trees thus removed.

Of course, our inability to mark ourselves all these trees given over to the privileged people adds immensely to the difficulties of our control. This is sufficiently explained from the fact that the presence of fresh signs of felling within the forests may signify either one of two things: that material has been stolen, or that privileged villagers have been operating there. In fact this alternative makes control impossible, when applied to the inferior species. When officers in high position comment on our assumed parsimony and want of generosity in regard to all privileges to the people, it would be as well if they bore in mind our real motives, which are motives of control, and not attribute to forest officers harder hearts than they possess themselves. Further on, we shall see that forest privileges on an abnormally large scale are conducive to immorality and corruption on the part of all the parties concerned in the distribution of the produce.

The method of check in use for controlling the supplies given to the privileged classes.—Although we have, in most instances, no practical means for determining whether or not the indent submitted by the privileged individual is justified by his actual requirements, and that it is often doubtful whether the person indenting is a privileged individual at all, yet we have, of course, been driven to impose certain maximum limits beyond which we refuse to supply without further enquiry into the circumstances of the case.

These limits are so liberal in themselves that any demand over and above them would necessarily call for an explanation. They are, in fact, based on what should be sufficient to construct, at intervals of a year, a new house, a new plough with spare share, a new cattle enclosure, &c., &c. But, in respect of fuel, they are based on as much as the person can carry away on his head during every day of the year.

In a former article of mine in the *Forester* on the subject of the privileges in these forests, I made the mistake of saying that there were no limits to the indents which could be made by the privileged people. We have limits, although they have not any legal sanction, having been dictated by motives of pure necessity. Moreover, being open to all kinds of abuse which, under our existing arrangements with the privileged populations, we are powerless to prevent, these limits have no practical use, no real efficacy.

Apart from the fact that, in such a large community, it is impossible to discriminate between the privileged and the non-privileged, it would be too much to expect from our officials that they should have such a memory for faces as to be able to recognize all those who came more than once with the same

indent during the same sanctioned period. And then it is, of course, easy for such a would-be rascal to gain his object at any time by getting some other person to represent him. In the case of all timber requirements, the privileged indenter has to provide himself with a permit. By these means we have at least the advantage—if it is one—of being able to distinguish in the forest between the downright, open, unblushing thief, and the more wary, circuitous, plausible scamp who has elected to shield himself under cover of a licence obtained from his friend the guard, or perhaps his friend the Ranger, with or without payment of a consideration.

In the case of fuel it would be manifestly impossible for us to grant any permits at all. Being a daily indent on the part of so many thousands, this fact should explain itself. Nevertheless, we have our little endeavour. Those wanting fuel proceed before the guard of the block contiguous to their abode, and this official stamps each applicant somewhere on his body with a composition of charcoal and water, warranted, without extreme care and neglect of the proper ablutions, not to last for more than the day in question. Persons taking any fuel without these marks upon them are assumed to have no right to the privilege.

At the best this procedure is a clumsy and makeshift expedient, and can be only excused in the absence of any other deterring conditions. In practice, we cannot apply an intelligent check to the present considerable consumption of fuel by so-called privileged persons, unless the indents are made collectively by the inhabitants of each village, and after stated periods only—not less than one calendar month.

The Ranger keeps registers, in which are entered the particulars of each indent granted to a privileged person. But, for reasons already mentioned, the value of the data contained in these registers should not be too much relied on.

It will be seen that, to all intents and purposes, the Rangers, and in certain cases the guards, are masters to extend the application of the privileged rules to all such persons whom it may be in their interest to befriend. It is probable that the whole privileged system is regarded by the underpaid subordinates of the department as a providential means for adding on to their miserable stipends, and for gratifying a petty love for tyranny in regard to such as are too poor to be able to respond to their demands. No doubt, among the privileged populations themselves, the privileges are abused for the purpose of an illicit traffic between themselves and the less fortunate people beyond their limits. Cases of both forms of corruption have been before the Magistrates, and would be more frequent if we had the means, and the legal right, to do police duty on the confines of the privileged zone.

Such extensive privileges as those accorded in the Bahraich

forests constitute a barrier to any efficient system of control, and sow corruption and discord among those who receive, and those whose office it is to supply.

Table showing the maximum limits within which each privileged person is customarily supplied.—I now proceed to give, in full, a statement showing the maximum limits already referred to, within which each privileged householder is customarily supplied. Exceptions are, of course, made in cases of fire, floods, or any other unavoidable contingency.

A.—Timber for House-construction—

38 rafters,	or "koros,"	(girth	8″-10″,	length 10′-12′).
3 posts,	or "táms,"	(„	18″-36″,	„ 12′-15′).
6 props,	or "túns,"	(„	18″-24″,	„ 5′- 8′).
1 ridge-pole,	or "bandir,"	(„	24″-36″,	„ 15′-25′).
2 wall-plates,	or "sardals,"	(„	18″-24″,	„ 15′-25′).

Total, 50 pieces, of a total cubic capacity of 50 feet.

B.—Timber for Implements—

1 harrow, or "saráwan," (42″ girth by 15′ length).
1 rice-press, or "óklee," (42″ „ „ 3′ „).
1 yoke, or "máchis," (from dry material on the ground.)
1 plough-handle, or "jhanjha," (from dry material on the ground.)
2 plough-shares, or "khopi," (from dry material on the ground.)

Total, 6 pieces, of a total cubic capacity of 20 feet.

C.—Miscellaneous—

8 machán-supports, (18″ girth by 8′-12′ length.)
500 púlas of thatching grass.
5 head-loads of withes } cut generally from smaller branches
25 head-loads of thorns } of bushes.
1 head-load of firewood (not sál) per diem, or
1 2-bullock cart-load per mensem.
10 posts for cattle-enclosures, (18″ girth by 4′-5′ length.)

Total cubic capacity of timber per annum = 90 feet.
„ „ „ fuel „ „ = 600 „

The system of control employed in the Government forests of Bahraich. General remarks.—Most of what has been written by me in the preceding pages related in some way or other to circumstances tending to obstruct the course of control within the Bahraich Government forests, and to take away from its efficiency. In this way, I reviewed the unfavourable influences exercised on this control by the absence of a corresponding check on the exports from the Nepalese forests and from private forests adjacent to our own, by the presence of timber dealers on the outskirts

of the Bahraich reserves, and by an extensive system of irregulated privileges within the latter.

Control is, of course, but a general term indicating the means of prevention employed in reference to the occurrence of a state of things contrary to our wishes. In connection with the present subject, we are only concerned with the means of prevention made use of by the Department for opposing thefts of material on the part of the public, and thefts of revenue on the part of our officials. I shall deal with both sides of the question separately. For the purposes of this chapter any one means of prevention can be denominated a check.

The check exercised on the proceedings of the general public within the Government forests of Bahraich.—It is evident that respect for the property of Government, as seen in timber and other forest produce, is principally maintained by the help of our establishment of rangers and guards, who, to this effect, perform the functions of ordinary police officials. But to facilitate and render more fruitful of results the operations of this protective force, it is always necessary, in a forest control, to have some ready means for distinguishing between those who have authority for what they are doing in the forest, and those who have no such authority. This end is attained, in the Bahraich forests, by a system of permits and passes, and timber marks. This I shall now proceed to explain in detail.

Permits.—The intending purchaser of material from a Government forest in Bahraich has, first of all, to provide himself with a permit from the officer in charge of the range to which that forest belongs. This permit constitutes the purchaser's credentials, the justification of his proceedings within the forest. It is, therefore, a very necessary instrument. Even the Nepalese think so, as we have already seen. To obtain the permit, the purchaser has to pay a first instalment on the probable cost of his purchase. This instalment—generally equivalent to a third of the value of the purchase—is our security for the good-faith of the permit holder. Without this security, much loss would ensue to Government, and much injury to the forests, through the abandonment by the permit holders of material felled or collected by them, as also by the neglect of some one or other important forest regulation.

The possession of a permit by all authorized persons enables us at once to discriminate in the forest—assuming, of course, that the said permit is a valid one—between those who have a right to what they are doing, and those who have no such right.

In the permit are entered the instalment paid by the intending purchaser, the date of the transaction, the man's name and residence, the kind of timber (dry or green, log or pole, sál or other species) or other material that he is in quest of, the locality whence it is to be obtained, and the spot to which he must subsequently transport it for purposes of measurement.

It is, moreover, stipulated in the permit that its holder shall not be longer than six months in settling his accounts with the Department.

Permits have to be given up by the purchaser when no longer required by him. They are then submitted to the divisional officer who sees them cancelled, and made unfit for further use. Were this not done, some purchasers would be tempted to act dishonestly on the next occasion for their requiring material from our forests—a proceeding rendered more easy in Bahraich perhaps than elsewhere by the ignorance of the guards, most of whom can neither read nor write.

The permits are supplied by the divisional officer in books similar, in all respects, to ordinary bank cheque books. In the same way, each permit is serially numbered, and has a counterfoil attached to it. The necessary headings in these permits are printed in Hindi, and in Persian.

Passes.—When the purchaser has transported his material to the place appointed for measurement, and has succeeded in getting the proper official to take these measurements, and to settle his account with the department in accordance therewith, he is entitled to obtain a receipt for his money and a declaration of his right of ownership in that material. This is effected by means of the pass. The pass contains all necessary particulars in connection with the transaction. The purchaser's name is entered in it, his place of abode, the kind of timber or other material bought, the number and measurement of the pieces, the date of purchase, &c., &c.

The pass is the purchaser's sole title of ownership in the material corresponding to it. Passes have their headings printed in Urdu and in Hindi, and are issued to the proper officials by the officer in charge of the division, who, first of all, takes note of the numbers of such issue. Like the permits, the passes are bound in book-form, each book containing a given number of passes with their attached counterfoils, and each pass bearing its own serial figure. Unlike permits, however, the pass continues to remain in the custody of the purchaser. This calls for no explanation.

Of course, there is danger of a pass being made use of by the purchaser to cover more than its one and original purchase. In Bahraich, where so few of the protective establishment can either read or write, this contingency is especially to be guarded against. We shall return to this subject further on.

Timber marks made use of in the Bahraich Government forests.—Timber marks are generally employed for four distinct purposes :

(*a*), to distinguish trees that we wish to fell from trees that we desire to maintain standing ;

(*b*), to show ownership in the timber ;

(*c*), to indicate that the timber so marked has been sold and paid for ;

(*d*), to indicate that the timber so marked has been duly examined at some particular inspection post.

In Bahraich, the divisional officer has all green mature sál trees that are about to be felled, marked, in his presence, with an impress only used for that purpose, and which he keeps under lock and key. Green trees of other species are similarly marked by the Rangers, who have their mark for the purpose, also kept under lock and key.

Dry timber of all kinds, windfalls, drift timber, line-timber, &c., &c., is marked for intending purchasers by the guards, deputed for that purpose by the Rangers. It would evidently be an advantage if this task was not delegated to such inferior subordinates; but it is impossible that the Rangers can themselves attend on all the purchasers for dry material, and other inferior classes of timber. There is, unfortunately, therefore, no other alternative. The object of marking at all dry and fallen timber is to afford evidence, in any particular case, that the felling or conversion of such timber within the forest is being done by authority, or not. Without this practice, the presence of a recently felled dry sál tree, or of a recently logged windfall on the ground, would give us no information as to whether such timber had been operated upon by a duly titled purchaser or by a thief. The Bahraich forests are so surrounded by a dense population of cultivators, that many small precautions are rendered necessary that would be futile in other forest districts. Of course, the marks used by the guards would be of no avail for any other form of timber. I have previously referred to the fact of our inability to mark the thousands of poles removed every year by privileged villagers. The inference is that we have no means of checking the illicit felling of this class of timber, which includes almost all other species but sál below the dimensions of 3½ feet in middle girth. This is a very serious matter, but there really appears to be no help for it. In Europe we should be able to amend such a state of things by confining the operations of these people to stated localities each year; but in India the protection of the forests at all appears to be, in these cases, dependent on an implied understanding that the surrounding populations are not to be inconvenienced in the least degree. And, of course, to make a villager proceed five miles for his timber instead of two miles, as formerly, would be to inconvenience him. People refuse to understand that the result of non-interference must be that this same villager, or his children or grand-children, will have to travel hereafter five miles whether he or they like it or not, and that without the prospect now afforded of being able, after a time, to shorten the distance. These things do not belong to the politics of the day.

In certain cases, we have to mark Government timber with a distinguishing impression, so that it may be easily recognizable amid timber belonging to other parties. For instance, if we

are about to despatch sleepers to any station outside forest limits, it would be necessary for us to apply the Government stamp to each of these sleepers. A recent serious robbery of Government timber in Bahraich was mainly brought to light by the presence of these proprietory marks.

All timber sold by us in Bahraich is stamped with the sale-mark. This mark supplies us with a most useful accessory check. Because the absence of sale-marks on any timber in transit, or collected near to our Government forests, would alone suffice to arouse a reasonable suspicion of that timber having been stolen. Evidently, however, the pass is the only irrefutable evidence of ownership in any class, or kind, of our forest material. In many instances, the material is not susceptible of even receiving a sale-mark; witness fuel, and nearly the whole lot of minor forest produce. Here, there is nothing but the pass to confirm the lawful removal of the material. This is, of course, a great, but unavoidable, drawback when there is nobody near of whom to make enquiries; although the presence of sale-marks is not necessarily conclusive evidence as regards the material in question, unless supported by a pass in due order, and corresponding with it in all respects. Without such a pass, this marked material might indicate a number of possibilities. The material might have been stolen from some other purchaser, or somebody might have become possessed of the Ranger's sale-hammer, or the Ranger himself might not be an honest official.

Value of all the preceding instruments of check on the proceedings of the public within the Government forests.—Taken together, all these different methods whereby the lawful purchaser can be distinguished from the dishonestly-minded, are in themselves excellent, and should be sufficient for our purposes, but for a variety of causes which take away from their real value and practical utility.

One of the most serious of these causes is seen in the ignorance of our forest guards, but few of whom can either read or write. The use of old and invalid passes is, thereby, rendered a comparatively easy proceeding, as also the subtraction of material in excess of what has been entered in the pass. In a similar manner, it is possible for a dishonest official to give away, along with the pass issued by him, material that is not mentioned in the latter, conscious as he would be of the small probability of the discrepancy attracting attention. Because, practically, since there are no regular inspection posts in Bahraich for examining material passed out of the forests under the authority of the officials whose duty it is to issue passes, our illiterate guards constitute the only obstacle to the commission of such very possible frauds as the above. The control, in the field, of the officer in charge has not that value in Bahraich which it otherwise would have, because of the very scattered nature of the

forests in that district, and the consequent impossibility of exercising, at his hands, a continuous supervision of the kind demanded. The two most valuable forests in Bahraich are 40 miles asunder, and each of these has an area of from 120 to 170 square miles, being, moreover, themselves cut up into isolated groups that cover an extensive line of country. It, therefore, happens that when the one superior officer in Bahraich leaves the one important extremity of his division for the other, the Ranger in charge of the former can accurately depend on not seeing him back again, under ordinary circumstances, for at least a month. In the meantime, the same Ranger, if at all so inclined, could, with very little risk to himself, abuse his powers to a considerable extent.

Granting again that all the smaller officials could read—and we find it extremely difficult to procure able men of this class on the present scale of salaries—there are not enough of them to render serious service in this direction.

Moreover, without any ulterior check on their own acts, I much doubt whether we should place too much reliance in these lower subordinates. Under actual conditions, I think it more than probable that they see in stolen material only an occasion for adding on to their store of ready-money, when such can be done safely. It is the poor and the helpless whom these people bring forward in periodical illustration of their zeal.

I have referred at such length to the difficulties of control engendered by the nature of our relations with the privileged populations, with the Nepalese and other owners of forest, and with timber merchants living off our own reserves, that it will be unnecessary for me to return to the subject. Hitherto, I have freely suggested remedial measures in respect of all circumstances that tended to affect our control or our revenues in an unfavourable sense. In the present instance, my recommendations will find their proper place at the conclusion of what I have still left to say in connection with the control of the Government forests.

The check exercised by the Divisional officer on the proceedings of his subordinates.—The check exercised in the Bahraich Government forests by the officer in charge, on the proceedings of his subordinates, can be divided into :—

(*a*), the field-check, and

(*b*), the home-check.

The former results as a consequence of the personal supervision and inspection of the forests, and of all material in transit, or collected within or near to the forests.

This form of check hardly calls for any remark. It is evident that the more often the officer in charge looks after his forests, the less risk will there be of his officials abusing the powers conferred upon them, and entering into a criminal partnership with the public.

Constant and repeated supervision on the part of the divisional officer and his superior assistants—if he has any—is, therefore, the one great deterrent of forest offences. I have mentioned how it is that, in Bahraich, this very necessary supervision is rendered difficult by the special circumstances of the district, and how, in consequence, the Rangers are left too much liberty of action. Certain classes of forest offence can, of course, be discovered after long lapses of time; lopping, for instance, or tapping trees for resin. Conducted on an important scale, such operations as these would, unless previously reported, at once point to collusion with the forest officials; so also would repeated grazing within a closed tract unaccompanied by the seizure of cattle. On the other hand, we have seen that, in certain circumstances, a number of abuses, and offences, such as thefts of young trees of inferior species, dry timber, minor produce, &c., &c., can be effected without leaving any suspicious traces behind in the forests. Under the special conditions of the Bahraich Government forests, therefore, the field-check resorted to by the officer in charge is not the valuable and fruitful element of control that it is in other forest districts.

The home-check is that check which results on a comparison of permits and passes issued to purchasers with the counterfoils, or duplicates, of the same. The latter constitute the vouchers in support of the revenue statements submitted by those officials whose duty it is to issue these permits and passes. In Bahraich we have seen that it is the Rangers who do this. The particulars entered by them on the permits or passes issued to purchasers have to be entered by them, likewise, on the corresponding counterfoils, the latter subsequently going in with their monthly accounts. It is evident, therefore, that the particulars of each permit or pass issued by the Rangers should agree in all respects with their counterfoils, and that the particulars on the pass and its counterfoil should also correspond with the material delivered.

As applied to the first instalments of revenue received by the Rangers, this check is ample and sufficient, because the original permits have to be returned to the head office after issue of the corresponding passes.

It is, moreover, of very little concern to us how much the purchaser has paid in the first instance, so long as we receive the proper amount at the time of settlement, that is to say upon his receipt of the pass. For the purposes of this check, therefore, we are only seriously concerned with the passes. All that we have to do with the permit counterfoils is to see that they have been issued seriatim, that they are all accounted for. It is evident that, in regard to the passes themselves, the check is entirely dependent on the occasions that we have had for taking note of the originals in the hands of purchasers; and I have already more than once reverted to circumstances which tend to

make those occasions few and far between, or which make it easy for intending rogues to time their operations by the periods of absence that intervene between the superior officer's visits to the same forest—periods which, as I have said, are necessarily frequent and continued in Bahraich.

A comparison of the kind referred to should reveal some one of the following facts :—

(*a*), that the pass and its counterfoil agree with one another and with the material corresponding to it. In this case, of course, the account is a correct one.

(*b*), that both counterfoil and pass agree with each other, but not with the corresponding material.

In this case, if the value entered in the pass is greater than that of the material, the difference will, no doubt, be due to an error of calculation. If the opposite, then the discrepancy may have originated in the same way, or in an attempt to defraud. The evidence in favour of the last conclusion will, of course, vary with the circumstances of the case, and with the gravity of the amount that has not been accounted for. You may accept it as granted that the official will always have some natural cause to which to attribute the discrepancy in question. And he has always a very plausible excuse at his command, namely, that carelessness in measuring quantities of which the very best among us are, occasionally, capable. For this same reason you may, with justice, conclude that no difference is ever found, in practice, between a pass and its counterfoil.

Of course, if the excess timber had not been found marked with the sale-hammer, the responsible official would be in a position to say—although not necessarily with reason—that the purchaser must have stolen it subsequently to receiving the pass from him, and that with or without the collusion of his subordinates.

Remedial measures.—When any remedy, or improvement, has suggested itself to me in connection with the many questions treated of in this article, I have usually concluded by mentioning it. The measures which would, in my opinion, therefore, add to the value of our existing system of control for the State forests in Bahraich, have, in part, been already explained, since nearly all of the questions previously discussed have, directly or indirectly, related to that control. The last chapters had for subject the methods of check in operation for controlling the material disposed of to purchasers, and for restraining the proceedings of our officials within the sphere of the trust committed to them. I have been obliged to recognize the fact—fact, in my opinion—that, owing to the existence of a number of special circumstances, the methods of check employed by us in Bahraich, most excellent in themselves, are in reality more or less abortive of results. For the deficiencies last mentioned by me, I can, after recommending the very necessary strengthening of the

establishment, suggest no better remedy than that already briefly referred to by me in connection with the questions of Nepalese and private forests. I urge once more the maintenance of inspection posts for the examination of all material passing out of the Government forests. I have calculated that nine or ten such posts would suffice for the division, and that purchasers would not be subjected to any unreasonable inconvenience by being obliged, by law, to report themselves and their material at these posts. I have calculated, moreover, that by making all conveniently situated police stations do the duty of these inspection posts, the latter could be reduced to about five or six. This is not very excessive. It is evident, as I have already had occasion to remark, that it would not do to subject one owner's property to this system without doing the same with all, although I only refer here to the Nepal forests, and to such private forests as lie very near to our own. We do not wish to afford purchasers still further reasons for shunning the Government forests. We have seen, moreover, how very desirable is this control of Nepalese and private material, and that, in its absence, our own must continue unsatisfactory.

At each inspection post, as above, I should recommend having one mohurrir on Rs. 8, and two chuprassies on Rs. 4 per mensem. Instead of issuing a single pass, as at present, the Ranger would, under my proposal, give two passes along with each purchase, one of which the mohurrir at the inspection post, or chaukie, would keep, subsequently submitting the same to the head office for purposes of comparison with the Ranger's corresponding counterfoil voucher, with which it should agree, as already explained. Of course, the material would have to be examined at these chaukies and compared with the corresponding passes, and it would have to be seen that the latter were not old and invalid, or forged, or otherwise insufficient. Suspected material would have to be detained pending further investigation.

We should have necessarily to be careful of collusion between the "chaukidars" and the purchasers. But if the district police—in their capacity of guardians of the property of the public—were directed to scrutinize all timber in transit, and to compare covering passes, I think we might feel fairly safe against such a contingency. The Rangers being, by these means, left in uncertainty as to the number of busy persons who might interest themselves in their transactions, would be careful of committing themselves, and the inferior officials would have to follow in the same line of conduct.

It will be seen that the measure here proposed only tends to approach our system of check, as near as circumstances will permit, to the excellent and well-known "Khám-tahsil" system made use of in parts of the North-West Provinces.

Conclusion.—In conclusion, I desire to make it perfectly well

understood that, in composing the present article, I have not been moved by any inclination to indulge in offensive criticism of a condition of things instituted under the auspices of my seniors, in accordance with an experience and knowledge of the subject which should be much greater than my own. In writing this article, I have been prompted by two considerations: firstly, to describe and publish circumstances which can but be of great interest to all forest officers, as also to district and other authorities connected with Bahraich, and subsequent officers in charge of these forests; and secondly, to give an exposition of my views in respect of what should constitute an efficient control under circumstances of special difficulty. I have done my best to achieve these results without presumption, and without any offensive display of superior wisdom, as also without indulgence in the morbid practice of "picking holes" in schemes of solid usefulness. But without a consideration of the weak aspects—as seen from my own point of view—of each of the questions treated by me, my subject necessarily fell to the ground, and a discussion of much instructive importance became impracticable.

It is to be hoped also that the reader will find useful information in my article quite apart from my forced criticism of the good and the bad points in the methods of check applied to the illicit removals of material from the Bahraich Government forests.

It must not be supposed for an instant that the measures recommended by me in the preceding pages, the openings for fraud pointed to by me, are in any way connected with the presence of an abnormally corrupt condition of things in Bahraich. I do believe that, under cover of the privileges, much undiscovered theft is committed, and that the guards are in no way to be depended upon. But I have every reason for knowing my Rangers to be singularly honest and upright men, a circumstance to which I attribute the almost total absence of evidence in support of the commission of those graver abuses which, as I have endeavoured to show, nothing in the machinery of our control itself conduces to render difficult.

Of course, such an admission on my part—an admission which it gives me the greatest pleasure to make—militates in nothing in favour of a state of things which is, in my own opinion, an inducement and a temptation to those who are not honestly disposed.

But what I wish to be well borne in mind by the reader is that nothing in the preceding pages has been written in any personal sense.

My object throughout has been to describe the action of a certain human mechanism, and in doing so, I have assumed it to move in that moral atmosphere which is most commonly met with under the circumstances of the case.

CAMP BAHRAICH:
24th September, 1885.

E. P. DANSEY.

FOREST ORGANIZATION FOR BEGINNERS.

Chapter I.—Introduction.

By *organization* is meant the division of a forest into groups, the determination of the quantity of material they contain, and of the quantity of wood which may be annually, or periodically, drawn from the forest in order that the proprietor may derive the greatest possible benefit from the soil.

It will generally be found that a forest consists of groups of trees distinguishable from each other by differences of height or species. Here we may find a collection of blackwood-trees 40 to 50 years old ; there one of the same, or another, species, consisting of trees 90 to 100 years old ; or, again, we may find a group containing more than one species, but still with trees, in the main, of about the same height ; sometimes, we come across groups containing trees of very different ages, but this form of aggregation is less common, because, in groups growing naturally, the higher, or older, trees gradually suppress by their shade, and sooner or later kill, the lower, or younger, ones, so that it is only when a group is very open that we are likely to find trees of all ages mixed up together. A forest, therefore, consists of a number of units which are well-defined by reason of their differing in height, age, species, density, or other marked feature, and a stretch of forest which appears tolerably uniform in respect of such qualities is technically called a *group*. As a rule, it is not convenient to have a group occupying much over 100 acres, but often a far larger area is found to contain a uniform mass of forest, and it then becomes necessary, for the sake of convenience in organizing the forest, to split it up into two or more groups. It is usual to separate such groups by roads, or *rides* as they are called technically, and each separate portion then forms a distinct group. Other suitable means may be substituted for rides ; a canal, or road, for instance, which forms a suitable line of demarcation. The area occupied by a portion of forest so isolated is called a *compartment*. On the other hand, a group is often too small to be separated by means of unproductive rides, and in that case a compartment is made to include two or more groups, which, when their lines of demarcation are not naturally distinct, may be separated by narrow lanes, a few feet broad, cut through the forest ; by small mounds of earth at the angles ; or by any other inexpensive means ; and the area occupied by each group is then called a *sub-compartment*.

It is evident that, in order to carry out the formation of compartments, a map showing at least the boundaries of the forest is necessary. The organization of a forest should, therefore, be preceded by a survey of its boundaries, and also, if possible, of its topography generally, a good plan of which

greatly facilitates the splitting up of the forest into compartments.

The operations of organization and the survey of forests may be classified as follows :—

I. THE SURVEY OF THE FOREST AREA.

II. DIFFERENTIATION—including the formation of compartments, sub-compartments, rides, and roads for the extraction of the produce.

III. ASSESSMENT—which includes an estimate of the age, height, quantity, rate of growth and value of groups, and all other estimates concerning the present or prospective value or yield of material, such as, for instance, of thinnings.

IV. DETERMINATION OF ANNUAL, OR PERIODICAL, YIELD.

V. A PLAN OF OPERATIONS—showing the parts of the forest to be cut, thinned, and re-stocked during a given period (usually 10 to 20 years).

The object of this somewhat elaborate procedure is, in the first place, to find out the most advantageous revolution for the forest.* This generally depends on what description of wood, which the forest is capable of producing, is most in demand in the vicinity. Secondly, it may be necessary, in order to determine the maximum uniform yield possible during a revolution, or period. But it is not always necessary to carry out all operations noted above ; the degree of elaboration increases with the length of the revolution. The simplest process suffices for a coppice-forest ; all that is necessary in such a case is to divide the forest into a number of compartments equal to the number of years in the revolution, which for coppice never exceeds 40 years, and in this country need seldom exceed 15. Supposing, for example, we have 100 acres of tolerably uniform-

* The term *revolution* is used to denote the number of years fixed to elapse from the production of a group to the time of its being harvested.

I am told that this term is un-English and bad, and that *rotation* is the proper word to use. My objection to the latter is, that it has been long used in our language to express successive changes of species in cropping land, and that it is, consequently, misleading when employed in the sense in which foresters wish to use it. Revolution may not be a very good term, but it is, at all events, not misleading. As for its foreign appearance—which may, or may not, be the case—that is, I fear, a charge which can be brought against a great number of our terms. Of the two, it seems to me that revolution is certainly the more apposite. No doubt, it was the revolution of a wheel which first suggested the term, because at the end of one revolution of a forest, or a wheel, you expect to come back to the starting point. But it is not usual to speak of a rotation of a wheel, revolution being the more correct term when you wish to convey the idea of one complete circuit. Again, revolution does not necessarily convey the idea of motion in a curve, whilst rotation does; but cuttings never progress in a circular direction. I do not set much value on refined distinctions of etymology; but I must confess that, from any point of view, the term here chosen seems to be preferable to rotation.

ly stocked forest under the coppice-régime, and subject to a revolution of 20 years. Evidently, we may cut $100 \div 20 = 5$ acres of forest every year without exhausting the supply, and the simplest plan would be to divide the whole area into 20 compartments of 5 acres each, and to cut one yearly, and so on for ever, always cutting the oldest group. We would then have what is called a *sustained* yield. The ideal to be aimed at in most cases is the cutting of an equal quantity of material every year, so as to avoid flooding the market during one year or period, and leaving it almost destitute of produce the next, because, setting aside the inconvenience caused to the consumers, the proprietor of a forest must suffer considerable money-loss by maintaining a fluctuating instead of a regular yield. The case of a forest worked chiefly for timber, and subject, therefore, to a much longer revolution than coppice, is less simple. It is then necessary to estimate the cubic contents of the oldest groups, at least, and to calculate the yield carefully, by methods hereafter to be described, because even in old groups of the same age and density there may be very great differences of yield per acre, and the yield cannot be fixed by area alone: sometimes the estimated cubic contents and rate of growth of the standing-stock constitute the sole guides to the quantity of material to be exploited.

SECTION I. SURVEY OF AREA.

Chapter II.

The survey of a forest, which has just been shown to be a necessary preliminary to its organization, differs in no way from the survey of any other object. I shall, therefore, take for granted that the student has a sufficient knowledge of the subject, and confine my remarks, in this section, to a discussion of the scale on which a plan of the forest should be made, to the method to be employed, and to the amount of detail to be included.

As regards the first point, it is unnecessary to say that, other things being equal, the larger it is up to a certain point, the more useful will be the map for our present purpose. The scales employed by the principal States of Europe vary from $1 \div 5000$ to $1 \div 3200$ ($12\frac{1}{2}$ to 20 inches to the mile). In India, a scale of 4 inches to the mile ($1 \div 15840$) has been very generally adopted. It is, however, too small to admit of all boundaries being shown on, or of the measurement of areas from, the map: it is, in short, too small to afford a really useful working-map, but answers well enough for mere inspection-work. So small a scale should, therefore, only be employed where very rough estimates of yield will suffice, that is, where

there is no fear of exceeding the capability of the forest, or where the forest is of little value, but in such cases the question may well arise as to whether the forest is worth surveying at all. As a general rule, we may assume that, if a forest is really worth surveying, it is most economical in the long run to employ a scale of not less than 8 inches to the mile (1 : 7920) which is the very smallest capable of giving satisfactory results: a scale of 12 inches to the mile is much to be preferred if the value of the property is considerable.*

* I wish to note here, that a friend, who has kindly looked through the proofs of this paper, considers a 4-inch scale suitable for maps of all Indian forests, excepting the very best: that, for inspections, plans of all important forests are absolutely necessary: that the 4-inch maps can be enlarged, and more detail added, when required: that maps of the School Circle, N.-W. P., on the 4-inch scale suffice for elaborate working-plans: that, if the 12-inch scale be adopted, the cost of surveys will be enormous: that German foresters consider the 4-inch maps of the Indian Forest Survey branch are already too elaborate and costly.

My friend's argument does not, however, affect my position, which is that really useful working-maps must be on a scale sufficiently large to show all the boundaries of forests and groups, and enable the forester to make fairly accurate measurements of the areas of sub-compartments from them. Now, a scale of 1 : 15840 is, I submit, inadequate to fulfil these conditions; therefore, I maintain that, if maps on a smaller scale than the 8-inch (which I consider a useful size) are made, accurate methods need not be resorted to, and that it is waste of money to spend large sums for elaborate trigonometrical and topographical surveys on the 4-inch scale. No doubt highly elaborate working schemes may be framed for forests mapped on this, or even a smaller scale; but how, then, about the accuracy of the data on which this elaborate fabric is raised? If the foundation is shaky, the stability of the superstructure must also be uncertain; and how much more so, it is difficult to say when, as in the case of working-plans, almost all calculations are the result of generalizations from comparatively minute data. Generally speaking, I do not think elaborate topographical maps are necessary, at all events in the first instance. Probably the heavy expenditure considered necessary for surveys on a larger scale than the 4-inch is ascribable to a desire to include a mass of detail when perhaps very little would suffice. It seems to me that the best plan to follow when it is necessary to have vast areas surveyed on a uniform plan (tracts which cannot, in the nature of things, be all suited to the same system) is, first of all, to make outline maps of the whole, giving only the most essential details, such as roads and rivers, and gradually to fill in minor details for any forest to the extent that may be found necessary from time to time. A great deal, perhaps all, of this after-work could be accomplished inexpensively by the local forest staff, and it would be greatly facilitated and cheapened by the differentiation of the forest.

The opinion, ascribed to German foresters, that our maps are too costly and elaborate, is not, therefore, opposed to my own; on the contrary, I feel confident that men engaged in organizing German forests would readily admit that the 4-inch scale is too small to afford satisfactory working maps.

As regards the argument that large scale maps are not necessary because small scale maps can be enlarged, all I need say is that it is very odd, if that be the case, that surveys on a large scale are ever made, as it would be so much more simple to make them on a small one. The fact is that scarcely anything is gained by enlarging maps on a very small scale; it simply means the reproduction of all the errors inseparable from the minor scale, plus the disadvantage of having less handy and more expensive maps.

The method to be employed must also depend on the immediate or prospective value of the forest. Any body can see at once that it would be folly to spend a large sum of money in surveying a forest consisting of scrub, which could never within a measurable period return more than, say, an anna per acre per annum. A cheap method, such as a survey with prismatic compass, showing only the most essential details, is indicated in such cases. But in more valuable forest, it is advisable to fix the boundaries at least by means of a theodolite-survey, and minor details with prismatic compass or plane-table. The most important details for purposes of organization, and which should all be included if circumstances admit, are—lines separating portions to which different rights are attached (*e. g.*, "reserved" from "protected" forest); all important physical features—such as canals, streams, roads, hill ranges—likely to affect the laying out of compartments or the working of the forest. Sometimes a general trigonometrical survey of the cultivated lands of a large tract of country affords a good opportunity for having the forest-lands comprised in the area surveyed at the same time. In such cases, it may not always be convenient to include as much detail as is desirable for the settled land: the scale of the two must of course be the same, but the amount of detail to be included for any forest should be regulated according to its value and the prospect of its requiring to be organized within a reasonable period. There could be no object in making an elaborate survey of a forest which would not, in all probability, be organized for an indefinite period, and the most that would be justified under the circumstances would be the fixing of the boundaries. A reliable framework of its limits would thus be obtained at a comparatively slight cost, and the foundation laid for a detailed survey whenever the occasion might arise, and that too, if required, by men who need not be highly accomplished surveyors. Then, when the forest came to be organized, if professional surveyors were not available, the survey could be completed by foresters who had gone through a course of instruction at the Poona College or at Dehra Dún. It is certainly difficult to exaggerate the importance to a forest official of possessing some facility in practical surveying, not merely on this account, but mainly because no one ignorant of the subject is competent to carry out certain essential operations of organization, which, for want of a better word, I have grouped together under the term *differentiation*, and which can be properly carried out only by professional foresters.

(*To be continued.*)

NOT SPORT BUT A NECESSITY.

WILD pigs are, in places where they cannot be ridden, an unqualified nuisance: and cases are not rare where the disforestation of flourishing plantations has been considered necessary in order to deprive the black-coated gentry of their zenana-khanas and nurseries.

They too often make themselves intolerable to the cultivators, and even a keen forest officer cannot help sympathising with poor Panjabi Singh or Jack Burman, who, driven to despair and wrath, fires the forest home of his black enemies.

The poor chap is probably run in and punished, and the plague he tried to combat gets worse than ever, as a new and denser crop of grass springs up after the fire, which killed the trees, but did not destroy the grass roots. All the time, nothing is more easy than to catch every pig in even a large forest, and this is how it is done.

Select a nice quiet, retired spot to build your trap. The trap is built in the form of an oval, the longer diameter some 40 feet, the shorter some 30 feet in length. It is constructed of closely fitting palisades with the bark left on. They should be at least 2½ feet in the earth, 7 feet above ground, and sufficiently strong to stand the simultaneous charge of a score or more of pigs. The trap has two heavy sliding doors, exactly opposite each other. Experience has shown that this facilitates the catching immensely, as the old sows, which are the most suspicious, apparently feel safer between two open doors, and do not so frequently give the signal for a bolt. A side door on the same principle, ending in a funnel-shaped passage with another small outer door, serves to transfer the pigs into cages for transport. *Fig.* 1 is a ground plan of a pig trap, and *Fig.* 2 shows the construction of the sliding doors.

These sliding doors can be set in such a way that the pigs either catch themselves, which however is slow work, and only to be recommended when a few stray pigs are still to be caught, or the spring can be pulled off by a man, and the whole sounder may be trapped at once.

The pull-off is similarly constructed for either purpose. The wire, and the rope end holding up the sliding doors must run over large well-oiled wheels. These rope ends terminate in a smooth iron ring, and the ring, when the doors are set for a catch, is hooked on to a smooth iron pin well driven home into a firm post, low down if it is intended that pigs shall catch themselves, out of their reach, if a pull-off by a trapper is contemplated. A lever is placed between the ring and the post, in form of a long stick, if the pigs have to let down the doors, in shape of a shorter board with a wire through it, when the pull-off is to be done by a man. The following sketch (*Fig.* 3)

NOT SPORT BUT A NECESSITY.

Fig. 1.

GROUND PLAN.

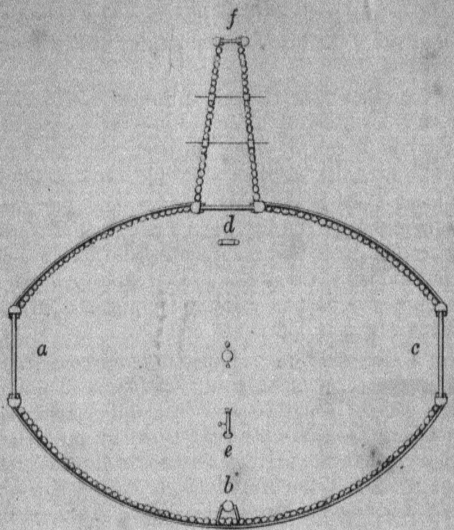


Fig. 2.

SLIDING DOOR.

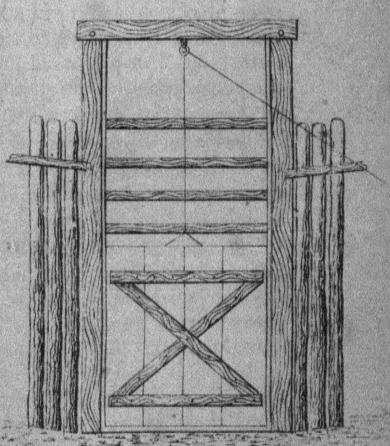
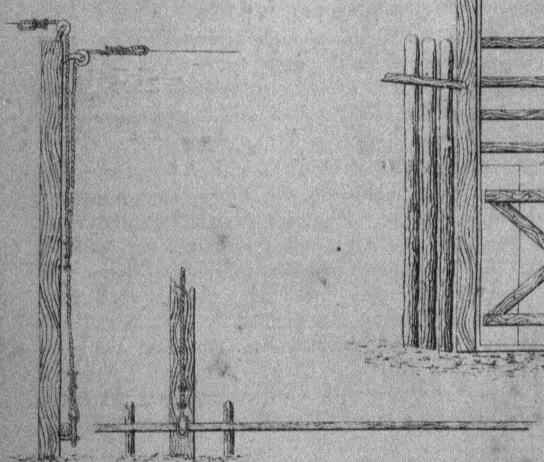


Fig. 3.

PULL-OFF.



Litho. T. C. Press. Roorkee. THOS. D. BONA, *Supdt.*

will explain better than any description how the pull-off is constructed.

The next thing is to build two machâns, at a short distance of 30 to 40 yards from each side of the trap, to enable the trapper always to take up his position down wind.

The trap is now complete, and the business of seducing the pigs to enter begins. This may sound doubtful, but nothing is easier in practice, and pigs may be collected in it from miles around.

Trains of coarse grain, more or less continuous, are laid from different parts of the forest, all ending near the trap, where shallow trenches are dug and are constantly refilled with a small quantity of grain of sorts, which should be covered by a layer of a few inches of soil, in order to prevent deer from entering together with the pigs. The former would soon make a *tabula rasa* of the food, and the animals would disappear before daylight.

In less than a month the pigs become quite accustomed to the trap, and in a very short time, to the trapper as well, who ought to be near the trap, or in one of the machâns for another fortnight or so at the time of feeding.

Then comes the time for action. The trapper is early in his machân, and pulls off when a sufficient number of pigs have entered the trap. Hereafter the trap can be set for self-action, to get hold of solitary boars and any other pigs that may have been left. The pigs should not be killed in the trap, or near it. The trapping must be done by the man to whom the pigs have grown accustomed, and any bungling in the catching should be avoided, or future takes will be rendered infinitely more difficult.

Dogs should never be taken in or near the trap; they have not lost the habit of Lance's cur, and pigs object to this as much as ever did the Duke of Milan.

F. O. L.

MEASURING TIMBER BY HOPPUS' MEASURER.

PERMIT me to ask your learned readers, through the medium of your Journal, if the usual practice of measuring round logs of timber by Hoppus' measurer or by Candy's book in this circle, is not incorrect and based on erroneous principle. The usual formula made use of is solid content $= L \left(\frac{c}{4}\right)^2$, where L = length, and c is the perimeter of mid-section, $\frac{c^2}{4}$ is the correct mean sectional area, when c is the sum of the four sides of the square, that is, the log is of square section; but if it be circular,

the correct sectional area is $\frac{c^2}{4\pi}$, and if $\pi = 3{\cdot}1416$, it is $= \frac{c^2}{12{\cdot}5664}$, which is decidedly much more than $\frac{c^2}{16}$. Mr. Mein in Vol. XI., No. 8, page 376, has published a table, in which he calculates the cubic content by the same inaccurate method. From the measurement it is plain that the logs are resembling the frustum of a cone, the true formula for which $\{L(A + A_1 + \sqrt{A_1 A})\}$ would of course be difficult to use in practice, but for fair approximation they may be assumed to be the frustum of a cylinder, the formula may be applied is L $\left(\frac{c^2}{4\pi}\right)$. You will see that by this method the content amounts to 14′ 11″ 5‴ instead of 11′ 7″ 4‴.

Bombay S. C. DIFFICULTY.

INFLORESCENCE OF DEODAR.

I SEND you ripe seeds of deodar from a tree marked last year, and from which young cones were taken at end of August 1884; this proves that from the time of impregnation by the pollen, (1st week in October 1884,) not more than 12 months elapses for deodar seed to ripen, and from birth of cone (about 15th August) 13½ to 14 months. I also send three new cones from the same tree, showing that at any rate for two successive years cones are found.

J. C. McD.

SQUIRRELS EATING TEAK SEED.

THERE are three teak trees in my compound which have blossomed freely every year since 1881, but I do not remember ever obtaining any mature seed from them, and the reason for this I discovered a few days ago, as I noticed one of the brown striped squirrels, which are so numerous in Dehra Dún, climbing from twig to twig, in the crown of one of the trees, and eating off the soft and unripe fruits one by one, so that there are now only a few visible here and there in the remains of the masses of inflorescence which cover the crowns of the trees.

W. R. F.

JJ. REVIEW.

GARO HILLS ANNUAL REPORT.

THE following extracts from Mr. Ward's review of the annual report of the Garo Hills for 1884-85 will be of interest to our readers :—

"The civil litigants were mostly foreigners, the Gáros settling their own civil disputes in their own way. The water-boiling ordeal seems the most popular trial :—

"A. claims a sum of money from B. B. resists the claim, denying the debt. A new earthen pot, filled with water, is produced, and placed upon a tripod of sticks, underneath a wood fire is lit, and B. calls upon his gods to be present and see fair play. If within a certain time, which is sufficiently long to make the water boil, the water does not boil, the victory rests with B., and A. is mulcted damages for having brought a false claim.

"Another and more dangerous kind of ordeal is that of the accused allowing himself to be tied to a tree in dense jungle, and to be left there for several nights and days on the chance of a tiger coming that way. If he escapes, he appears before the Deputy Commissioner and claims damages from his adversary, but Captain Maxwell refuses to make any award in such cases. The participators in this barbarous practice ought to be warned that they are incurring the risk of severe penalties if any harm should happen to the accused person.

"The export of ivory amounted to less than 5 maunds, or about half the export of the previous year. The rubber export is also trifling; the unlimited tapping of a few years back is said by the Deputy Commissioner to have destroyed three-fourths of the rubber-trees of the district. Only one license to tap rubber was issued in the year.

"While a good deal appears to have been done last year towards increasing the receipts of the Forest Department in future years, the figures for the past year do not show very satisfactory results. The time of the Assistant Conservator has been almost entirely taken up in constructing a cart-road from the recently reserved Dambu forest to the plains of Goálpára. When this road is completed, as it soon will be, a considerable revenue, estimated by the Deputy Commissioner at Rs. 20,000 a year for five years, may be looked for from this forest, and also from the neighbouring reserved forest of Darugiri. The Deputy Commissioner, however, doubts whether forest officers should have almost their entire time taken up in constructing cart-roads on a large scale at the expense of other and more legitimate work, and when a separate agency exists for the construction of such roads as the Forest Department require. There has been apparently a want of proper check over the proceedings of the sub-

ordinate staff of the department in the district, and certain irregularities came to light during the year, which the Deputy Commissioner thinks may have considerably affected the forest receipts, which have fallen to Rs. 13,968, as compared with Rs. 16,467 realised in 1883-84 and Rs. 18,155 in 1882-83. The attention of the Conservator will be drawn to the Deputy Commissioner's remarks. The depressed state of the Calcutta timber market, and the difficulty experienced last year in removing timber from the forest, owing to the short rainfall and early subsiding of the rivers, also operated to lower the forest receipts. Four maunds of rubber were collected, against 12½ maunds in the previous year, the realisations amounting to Rs. 253, against Rs. 750.

"The forest expenditure, on the other hand, has increased considerably in the past year, when it amounted to Rs. 29,919, against Rs. 20,997 in 1883-84 and Rs. 16,950 in 1882-83. There was thus a deficit on the year of Rs. 15,951, due chiefly to the construction of the Dambu forest road, a work estimated to cost over Rs. 14,000, and on which Rs. 5,835 are said by the Deputy Commissioner to have been spent within the year, and also to the building of a bungalow for the forest officer, estimated to cost Rs. 5,000.

"The number of licenses granted for carrying fire-arms was 340, against 273 granted in 1883-84. Of this number Gáros held 161 and foreigners (chiefly ryots living on the borders of the hills) 143. Guns are readily lent to persons wishing to destroy wild animals, and powder and ball are also given for this purpose, free of cost, from the Government store. The number of deaths reported from wild beasts was 35 only, against 55 in the previous year. There were only 4 deaths from wild elephants and 28 from tigers, as against 11 and 42 deaths in 1883-84. To meet the danger arising from wild animals, the people invariably travel with spear or sword; last year 48 wild animals (tigers, leopards, and bears, but no elephants) were killed, as compared with 58 killed in 1883-84, and Rs. 570 were distributed in rewards to the slayers. There are no professional *shikaris* in the district. The destruction as well as obstruction to cultivation caused by wild elephants continues to be very great, and must continue so long as permission is not given to private persons to hunt the elephant-*mahâls* not selected for hunting operations by the Khedda Department.

"The Dacca Khedda operations were extremely successful this year, and Mr. Sanderson, who hunted in No. 2 and part of No. 1 *mahâls*, in the south-west portion of the district, succeeded in capturing no less than 204 elephants. At the same time, 48 elephants were caught by the Mahárája of Shushang in the south-east of the district, who paid Rs. 5,000 for the lease of a portion of No. 1 *mahâl*. The Deputy Commissioner, referring to the mischief to crops and the danger to life caused by elephants, urges strongly that the whole of his district should not be constituted a preserve for the operations of the Khedda Department. He wishes the department to select beforehand the portion of the district they intend to hunt in the rainy season, and that the Deputy Commissioner be empowered to grant licenses to private hunters to hunt the rest of the district. The subject has already been brought to the notice of the Government of India."

III. Official Paper.

AGRICULTURAL INSTRUCTION IN GERMANY.

There was no Agricultural School of the first class in Prussia before 1835. In 1819 an Agricultural Professorship was sanctioned for Bonn; but the appointment was not filled up. In 1835 a School was organised at Eldena in combination with the University at Greifswalde. The foundation of the School at Poppelsdorf, near Bonn, took place only between 1843 and April 1847. At that time the organisation of the School was considered sufficiently complete to formally open it. At present the Kingdom of Prussia contains two High Schools of Forestry, 7 for Agriculture, and 3 for Veterinary sciences. The Kingdom contains next 16 schools for Agriculture of the second class and 54 of the third class; also 4 schools of Pomology and Spade Culture. Besides these regular schools, there are 64 winter schools and travelling instructors chiefly concerned with agricultural specialities.

2. There are 29 experimental stations of the first class, the main occupation of which consists in the control over manure, seed, and fodder. They have each a first class laboratory, and carry out constant scientific experiments and researches, not only in these, but in all other branches of agriculture, concerning life, nutrition, propagation, &c., of animals and plants.

3. Prussia contains some 1,700 societies connected with agriculture, bee-culture, cattle and horse breeding, &c. The greater number of these societies are centralised in Provincial Societies, and again represented in Berlin by a General Council for the Empire, which takes note of anything which occurs of general interest to agriculture, be it in the way of new discoveries, or legal proposals, or otherwise. The Council is perfectly independent of Government.

4. The teaching at the High Schools of Agriculture is divided into three main branches:—

(*a*). Chemistry and Physiology.
(*b*). Technics.
(*c*). Political Economy.

The following is the programme of the Agricultural School at Poppelsdorf:—

I.—*Introduction to agricultural studies*—
Encyclopædia, Methodologie, History and Literature of Agriculture.

II.—*Natural Sciences*—
1. Mineralogy and Geognosy.
2. Botany and diseases of plants.
3. Zoology, with special reference to the anatomy of domestic animals.
4. Physics (theoretical and practical).
5. Chemistry „ „
6. Physiology „ „
   (*a*), of plants,
   (*b*), of animals,
   (*c*), specially of domestic mammalia.
7. Agricultural Chemistry—
   (*a*). Nutrition of plants and manuring.
   (*b*). Characteristics and value of fodder, with special reference to fodder mixture.
   (*c*). Chemistry and Physics of plants.
   (*d*). Ditto of animals.

III.—*Mechanics*—
(1). Surveying.
(2). Mechanics, and knowledge of agricultural instruments and their construction.
(3). Buildings and communications.
(4). Draining and irrigation.
(5). Drawing.

IV.—*Political Economy and Law*—

V.—*Agricultural technics*—
(1). Fields and plants.
(2). Cattle and live stock.
(3). General management.
   (1) is sub-divided into—
      (*a*). Amelioration of lands and estates.
      (*b*). Of soils, manuring, treatment of soils, special culture (practical experiments).
      (*c*). Use of agricultural instruments in practice.
      (*d*). Pomology—vine and vegetable growing.
   (2) is sub-divided into—
      (*a*). General or breeding.
      (*b*). Specialities—horse-breeding, cattle-breeding, sheep, with special reference to wool, small animals, &c., bees.
      (*c*). Sanitation for domestic animals.
      (*d*). Accouchements and shoeing.

(*e*). Hurts and external diseases of animals; also epidemical and acute diseases.

(3) is sub-divided into—

(*a*). General management.
(*b*). Valuation of estates.
(*c*). Organisation of management, and budgetting.
(*d*). Agricultural book-keeping.

4th August, 1885. B. RIBBENTROP.

THE following table showing age of sleepers on different lines of Railway, is extracted from the Statistics of Indian Railways for the half year ending 31st December, 1884 :—

Railway.	Average age of Sleepers.		Percentage of renewals.	
	Wood.	Iron.	Wood.	Iron.
	Years.	Years.	Per cent.	Per cent.
East Indian, ...	6·0		3·85	1·88
Madras, ...	7·0	15·0	7·75	0·13
Great Indian Peninsula, ...	(*a*)	(*a*)	6·30	1·28
Bombay, Baroda and Central India,	12·0	10·0	7·18	0·60
Scinde, Punjab and Delhi, ...	12·0	12·0	10·69	0·33
Oudh and Rohilkhand, ...	12·0	11·0	1·19	0·50
Punjab Northern, ...	3·0	...	0·83	...
Indus Valley, ...	6·0	6·0	0 48	0·47
Eastern Bengal, ...	...	...	...	...
H. H. the Nizam's, ...	11·0	11·0	3·10	0·001
South Indian, ...	9·5	17·0	1·40	...
Rajputana-Malwa, ...	5·0	2·0	2·47	0·18
Northern Bengal, ...	6·0	3·0	8·69	0·04
Tirhoot, ...	5·5	1·5	5·19	0·09
Cawnpore-Achnera, ...	3·0		0·08	
Nagpur-Chhattisgarh, ...	3·5	...	3·5	...
Burmah, ...	6·0	...	0·80	...
Bhavnagar-Gondal, ...	4·5	...	0·001	...
Mysore, ...	3·50	...	0·01	...

(*a*) Information not available.

JV. Notes, Queries and Extracts.

Forests and Forestry in the Nizam's Dominions.—In His Highness' Dominions, which of course include the Hyderabad Assigned Districts, there are no "high forests" similar to what may be found on the Western Ghâts in the Districts of North and South Canara: there, one might walk for almost hours together without ever seeing the sky. In the Nizam's territory the best jungles are to be found near Chiculda on the Gawilghar range of hills to the extreme north of the Assigned Districts; and also in the talúks of Mahadapur, Pakhal, Kundiconda, Khummum-mett, Muddra, and Palúncha in the Elgundel and Khummum zillahs, and in the jungles in the neighbourhood of Nirmul, Mahúr, Sindkeir and Edlabad in the Indore zillah. In these, timber of large size is still to be got, but felling has been carried on to such an extent, and natural reproduction has been so impeded by annual recurring fires, that the forests are becoming exhausted, and the day is not far distant when all cutting will have to be prohibited and the forests given complete rest. To the west of the territory the jungle is little better than scrub.

The most useful timber and that which brings in the largest income is teak, this is sold both in the log and as tapering poles; these last are classified as first, second and third sorts, and are used in immense numbers each year as rafters for buildings, &c. The first sort measure 15 to 18 inches in circumference at the thickest part of the "bole," and are priced at H. S. Rs. 10 per 100: the second sort, 9 to 15 inches, bring in H. S. Rs. 8, and the third sort, 6 to 9 inches, H. S. Rs. 4 per 100; the purchaser paying all costs of felling and carting. Teak, bijasal, and bhútunkús (the devil tree) are sold by the piece, pieces of different dimensions having different names, such as "mahawunt," which represents a large beam, and by nine regular gradations, down to a "bunjara-kari" which measures $12' \times 4\frac{1}{2}'' \times 1\frac{1}{2}''$. Hitherto there has been great laxity in the classification of timber, but recently the Conservator has drawn up a new scale correcting the defects in the former system and pricing it per cubic foot. The three descriptions of wood above mentioned were priced at an average of 8 annas per cubic foot: ebony, satin and sheeshum at Re. 1 per cubic foot, and nulla-muddi (*Terminalia tomentosa*) and that splendid wood anjun or "Eppa" (*Hardwickia binata*) at 5 annas per cubic foot. It was only within the last three years that these

two last-named trees were included in the prohibited list: up to that time they had been included in the list of inferior trees, and were cut down indiscriminately by the lessees of the inferior timber jungles. The rates now charged for timber are greatly in excess of those which prevailed formerly; but those were ridiculously low and permitted an excessive profit being made by the timber merchant to the detriment of the interests of the Nizam's Government. It is fully expected that a determined effort will be made by those whose profits have been lessened, to get the rates reduced by with-holding tenders and thus *starving* the Government into submission, but the Forest Department can afford to stand a siege, and *rest* will be of incalculable benefit to the forests which have been so depleted, as to be threatened almost with extinction.

The finest teak is found near the Godavery, south of Mahadapúr, at an elevation above sea-level of 600 to 700 feet; and the worst-grown teak, near the railway line on the Gungawaram ghât at an elevation of over 2,000 feet; which would seem to show that high elevation is not suitable for this tree. The finest "anjun" is to be found near Kulloor in the Madra talúk, and magnificent specimens of "abnús" (black-wood) are to be found in the jungle south of the Pakhal lake. That giant grass the bamboo (*Dendrocalamus strictus*) grows more or less over the Northern, Eastern and Southern Districts, but it attains the greatest perfection in the Palancha zillah. This article of forest produce is still, as formerly, leased *en bloc*, but the system is open to many objections; its *only* recommendation being simplicity. A change is contemplated. Space precludes us from alluding any further to the forests in the Nizam's Dominions beyond saying that their area is still unknown: we believe a rough traverse is contemplated with a view of affording this information.

We will now say a few words on forestry, by which we mean the system adopted for conserving the jungles and working them so that they may not become exhausted, and that the Government may derive the greatest possible benefit from them. The system in vogue is far from satisfactory, and the blots in it may be summed up in two sentences: dual ownership, and over-centralization. Remove these blots and a decided step will have been taken towards introducing a new and better system. At present, while the superior timber in any jungle is under the care of the Forest Department, the inferior timber in the *same* jungle is under the Revenue Department, who lease out this portion each year, by auction, to the highest bidder: there is no limit whatever to the timber the lessee may fell so long as he avoids the prohibited descriptions, and as a result that the wastage is incalculable.

As no powers have been given to the assistants as regards selling timber, all sales must be sanctioned from the head office;

thus, great delay is entailed, and, rather than wait, many merchants supply their wants either from British territory or from private jungles. Before however extended powers are given to subordinates, from Darogahs downwards, a new check system must be introduced, or it is feared peculation will greatly increase. The Darógahs themselves should be men of a far superior stamp to those at present employed: some of these have been in the Forest Department from its commencement and (*miserabile dictu*) one or two of them can barely sign their names in any language. As vacancies occur they should be filled with men of some education: able to read and write, conversant with square and cubical measurements, and qualified to conduct a simple survey with compass and chain: preference to be given to men who know English. Some greatly improved system is also required in the issuing of licenses and passes for duty-paid timber and forest-produce. We commend our remarks to the earnest consideration of the Inspector-General of Revenue, and we trust that he may be able to evolve a scheme which may be creditable to himself and a lasting benefit to the Nizam's State.

We now propose to touch upon two subjects only, "Reserves" and "Nursery Plantations." The only *real* reserved jungle in His Highness' Dominions is situated north-west of the station of Dharur. It comprises about six square miles, and is fairly stocked with wood suitable for engine fuel. This reserve was selected by Major Mead, Engineer-in-Chief of the Nizam's State Railway, which was at that time (1873-74) under construction, and was intended solely for the supply of wood fuel. A survey was made and the selected area enclosed by a ditch. No fuel was drawn from it till the years 1880-81, when 15,000 to 20,000 tons were taken out. The reserve was then closed and, for the first time, all cattle were excluded; now after a lapse of four years' natural reproduction, it has progressed sufficiently to admit of its being partially worked again. The reserve has had two formidable enemies to contend against: the grazing by goats and fire. Of all quadrupeds, goats are most dreaded by the Forester; cows, bullocks, donkeys, horses are all bad enough, in their way, but the destruction wrought by them is not to be compared to that caused by goats, who wantonly nip off the top of every tender seedling they come across. The proximity of the railway is a source of danger; sparks from passing trains have been known to set on fire the grass close to the line, and from there it has spread into the reserve. By clearing 100 feet between the railway fence and the jungle, it is endeavoured now to minimise the risk. The grass in the reserve is of a coarse, rank description, and, when fired, burns with great energy, leaving its mark on the stems of trees 20 feet from the ground. It is in contemplation to make a *strict* reserve of the Muddulpully jungle, on the Anantaghorry Range, about six

miles to the north-west of Gungawaram. This is, at present, being worked for wood fuel, and is splendidly stocked with timber.

The only "Nursery" extant is about two miles north of the Dharur railway station, and is situated just outside the reserve. The site was selected by Captain Gaignoux, who at that time was in charge of the "Railway Fuel Sub-Division." The site is badly chosen, being on poor soil, greatly exposed to prevailing winds, and scarce of water. Through the indefatigable energy, however, of the officer who for the last few years has been in charge, the results have been fairly satisfactory. Besides indigenous seeds, Jamaica was laid under contribution for mahogany; Canada for the butter-nut, the hickory, and other species too numerous to mention; Bangalore for the jack, the casuarina, &c.; the Horticultural Gardens at Saháranpur for ornamental trees, like the *Grevillia robusta*, *Ceara* rubber, &c.; and the result is that the outturn of the whole, in spite of draw-backs, presents a very fair appearance. The fastest growing tree in the garden is the *Eucalyptus*, of which there are about a dozen species (this family it is believed numbers about 700 varieties!) Some of these trees, in three to four years, have grown 40 to 50 feet high. The handsomest tree in the garden is the "India rubber," and next to it is the *Grevillia robusta*. The Government of India, through the Resident, sent a supply of "carob" seed for experiment. After failure, from sowing in unsuitable soil, success was attained, and there are now several healthy plants 6 to 7 feet high: this seed failed to germinate in the Central Provinces. A number of carobs, and seedlings of other trees, to the number of 3,000, have been transported to Súrúnagar, where they have found an honoured resting place in the park attached to His Highness' new palace now under construction. The other trees and plants in the "Nursery" include sandal, túm, sirris, red-wood, mulberry, sissú, the rain-tree, Nagpore orange, Lucknow guava, *Hæmatoxylon campechianum* and mangoes; these last have failed miserably, growing some of them to a height of 6 to 8 feet and then coming to a stand-still.

Although we are conscious that we have left many points untouched upon, we must now draw our short sketch to a close, and will trust that the light we have let in on the Nizam's forests (it is well-known that trees always suffer from *darkness!*) will be productive of benefit to that Department.—*Deccan Herald.*

M. CAMBRELENT, Inspector of Public Works, has made a report to the Agricultural Society of France on the subject of the dunes in the *landes* of Gascony. These sand-hills cover a surface of more than 85,000 hectares; they are more than 80 me-

tres high and 5 to 6 kilometres wide. Before a method of arresting these was discovered they were being constantly pushed inland by the winds, invading and covering fields, villages, and even burying churches up to their towers. In 1780 Brémontier sought to render them immoveable by planting them, after many experiments designed to develop a primary vegetation. His work has been continued with perseverance, and it is only recently that it has been completed, and these 85,000 hectares, which menaced all the country adjoining, have become covered with a rich forest vegetation which has fixed the dunes in one place. A great public danger has been converted into a large forest. But this work, which renders permanent, dunes already existing, has not prevented the sea from throwing up on the coast new sand day by day, which forms dunes, which in their turn invade the permanent dunes. After having fixed the old sand-hills, the problem was to prevent the formation of new ones. To solve this it was decided to construct a dune above high water, in which all the conditions of the moveable dunes would be reversed. The form given to the latter by the wind is such that on the side of the sea they present a gentle slope, which the sand can mount easily as on an inclined plane, in order to fall down a steep decline. It is by the gentle slopes forming a series of inclined planes that the sand moves forward. The formation of the new dune was encouraged, but it was directed in such a manner that it had a steep slope on the side of the sea. To secure this a wooden palisade was erected about 120 metres away from the sea, all along the shore. The sand first struck against this in its progress, and fell at its foot, a portion of it escaping through the interstices left between the planks. The latter was carried some distance by the force of the wind, and fell, forming slight slopes, while the sand which fell at the foot of the palisade on the side near the sea formed a steep incline. Soon this reached the top of the palisade, and then the planks were drawn up by means of a special implement to the needed height, and the formation continued as before, the slope on the side of the sea growing steeper, while the other got more and more gentle. Ultimately the dune reaches such a height (generally 10 to 12 metres) that the sand can no longer get over it, and it is definitely arrested between the barrier and the sea. It falls back on the shore, unable to advance, until contrary winds come and blow it out to sea again. To fix the sand on the other side of the barrier, the *Arundo arenaria* is planted. The roots penetrate to a depth of 4 or 5 metres, and the plant always keeps its head above the increasing sand. The results obtained by this new dune (says M. Chambrelent) have been complete. The most violent storms have not been able to carry the sand over it; the latter has fallen back on the shore innocuous, and the advance of the inexhaustible sand coming from the sea has been absolutely arrested.—*Nature.*

EFFECTS OF THE CUTTING OF FORESTS ON WATER SUPPLY OF RIVERS.—Upon the territory of the commune of Labrugniere (a village of France) there is the forest of Montant, containing 4,524 acres, and owned by the commune. At the entrance of the forest, and along this brook, will be found several fulling mills, each requiring eight horse-power, and moved by water wheels which work the belters of the machines. The commune of Labrugniere had long been noted for its opposition to the forest regulations, and the cutting of wood, together with the abuse of pasturage, had converted the forest into an immense waste, so that this great property would hardly pay cost of guarding it, and afford a meagre supply of wood for its inhabitants. While the forest was thus ruined and the soil denuded, the waters after each heavy rain swept down through the valley, bringing with them great quantities of gravel, the *débris* of which still encumber the channel of the stream. The violence of these floods was sometimes so great that they were compelled to stop the machines for some time. But in the summer time another inconvenience made its appearance. Little by little the drought extended, the flow of waters became insignificant, the mills stood idle, or could run only occasionally for a short time.

About 1840 the municipal authorities began to inform their population relative to their true interests, and under the protection of better supervision the work of replanting has been well managed, and the forest is to-day in successful growth. In proportion as the re-planting progressed, the precarious use of the mills ceased, and the regulation of the water-courses was totally modified. They now no longer swell into sudden and violent floods, compelling the machines to stop ; but the rise did not begin until six or eight hours after the rains began, they rose steadily to their maximum, and then subsided in the same manner. In short, they were no longer obliged to stop work, and the waters were always enough to run two machines and sometimes three. This example is remarkable in this, that all the other circumstances had remained the same, and therefore, we could only attribute to the reforesting the changes that occurred, namely, diminution of the flood at the time of rain and an increase in its flow during common times.—M. CANTEGRIL, *Sub-Inspector of Forests, in Ami des Sciences.*

PLANTS UNDER TREES.—We have been asked recently to name a section of plants that could be planted under trees. We could name several, such as hollies, privet, euonymus, box, berberis, &c., with something like a preference for the latter. In berberis we get a genus of shrub possessing the highest qualifications for purposes of ornament ; and all the grander evergreen species do better under trees than in the open ; in fact, they require to be constantly in the shade. The soil in which these thrive best is

a deep, rich, moist, sandy loam, with abundance of water overhead and at the roots. Among the species the noblest of all is *Berberis mahonia japonica*, which for magnificence of foliage has no equal among hardy shrubs. It naturally grows in the form of a dense bush, with large pinnated leaves of hard texture and of a lively green hue. Specimens of it are now covered with spikes of flower-buds, which will open at the first break of spring weather, and soon be succeeded by bunches of grape-like berries, covered with a lovely bloom. Two other noble, large-leaved species which thrive under trees are *M. Bealii* and *M. intermedia*. For warm, sheltered gardens, *M. Nepœnus* is most beautiful, and *B. Fortune* is well worth having, but both these are rather tender. One of the loveliest of flowering shrubs is *B. Darwinii*, which blooms abundantly, and of which we have had spikes of bloom sent us on Christmas Day from Devonshire. One of the cheapest for common purposes, and a really beautiful species, though not equal to those already named, is *M. aquifolium*, well adapted to plant in quantity in town gardens, and to form game covers or belts for screening off the compost or rubbish yard from the kitchen garden. These are certainly the best for planting under trees.—*Land and Water.*

Amongst the recent arrivals we notice a sample parcel of Cape boxwood,* delivered at the West India dock per *Warwick Castle*, consisting of 55 pieces, weighing nearly three tons. The logs are of good sizes, sound and clean grown. This wood possesses a closeness of grain almost equal to the best Abassian boxwood, and it is thought will suit admirably for engravers' purposes. From the specimens of this wood, and engravings printed from it, which were shown at the Forestry Exhibition at Edinburgh last year, it would appear to be one of the best hardwoods yet put forward as a substitute to supply the demand for the ever-diminishing supply of boxwood.—*Timber Trades Journal.*

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* Mr. Hutchins will perhaps kindly report the scientific name of this tree.—[Ed].

V. Extracts from Official Gazettes.

1.—Gazette of India—

Nil.

2.—Calcutta Gazette—

The 4th October, 1885.—Mr. C. A. Richardson, Deputy Conservator of Forests, 3rd grade, is appointed to officiate in the 2nd grade of Deputy Conservators of Forests, during the absence, on privilege leave, of *Mr. J. T. Jellicoe*, Deputy Conservator of Forests, 3rd (officiating 2nd) grade, in Assam, with effect from the 19th July, 1885.

3.—North-Western Provinces and Oudh Gazette—

Nil.

4.—Punjab Gazette—

Nil.

5.—Central Provinces Gazette—

Nil.

6.—British Burmah Gazette—

Nil.

7.—Assam Gazette—

No. 327.—*The 3rd October, 1885.*—In modification of the orders contained in Notification No. 216, dated the 2nd July, 1885, privilege leave of absence under Section 138, Chapter X. of the Civil Leave Code, is granted to *Mr. T. J. Campbell*, Assistant Conservator of Forests, up to the 12th October, 1885, with effect from the 6th August, 1885.

8.—Mysore Gazette—

Nil.

9.—Madras Gazette—

No. 277.—*The 1st October, 1885.—Mr. C. Benson*, Assistant

Superintendent of Government Farms, to be Assistant Director of Agriculture, from 1st April, 1884.

No. 278.—*Mr. G. Homfray*, Assistant Conservator of Forests, 3rd grade, to be Assistant Conservator, 2nd grade.

No. 279.—*Mr. F. A. Lodge*, Assistant Conservator of Forests, 3rd grade, to be Assistant Conservator, 2nd grade.

No. 280.—*Mr. H. T. D. Sweet*, Assistant Conservator of Forests, 3rd grade, to be Assistant Conservator, 2nd grade.

These promotions to have effect from the 20th July, 1885.

10.—BOMBAY GAZETTE—

The 22nd September, 1885.—Mr. S. Hornidge, A.M.I.C.E., Assistant Conservator of Forests, 3rd grade, reported himself for duty to the Divisional Forest Officer, South Thána, on the 15th September, 1885, after office hours.

No. 8255.—*The 10th October, 1885.—Mr. G. A. Hight*, Deputy Conservator of Forests, 3rd grade, and Divisional Forest Officer, Bijápur, is allowed furlough for seven months from 28th October, 1885, or such subsequent date as he may avail himself of it.

No. 8291.—*The 13th October, 1885.—Mr. G. P. Millet*, Assistant Conservator of Forests, passed an examination in Maráthi on the 5th instant.

No. 8342.—*The 14th October, 1885.—Mr. W. J. C. Dunbar*, Acting Deputy Conservator of Forests, 3rd grade, and Divisional Forest Officer, East Khándesh, is allowed furlough on medical certificate for one year under Section 52 of the Civil Leave Code, Sixth Edition.

The 14th October, 1885.—Messrs. W. J. C. Dunbar, Divisional Forest Officer, East Khándesh, and *G. L. Gibson*, Divisional Forest Officer, West Khándesh, respectively delivered over and received charge of the office and duties of the Divisional Forest Officer, East Khándesh, on the 25th September, 1885, after office hours.

Messrs. W. H. A. Wallinger, Deputy Conservator of Forests, Poona, and *W. R. Gaundé*, Sub-Assistant Conservator of Forests, Poona, respectively delivered over and received charge of the office of the Divisional Forest Officer, Poona, on the 10th instant, after office hours.

The 9th October, 1885.—Mr. T. R. D. Bell, Assistant Conservator of Forests and Divisional Forest Officer, Central Division of Kánara, delivered over charge of his office to *Mr. B. J. Haselden*, Acting Assistant Conservator of Forests, in charge Kánara Saw Mills, on the 2nd October, 1885, after office hours.